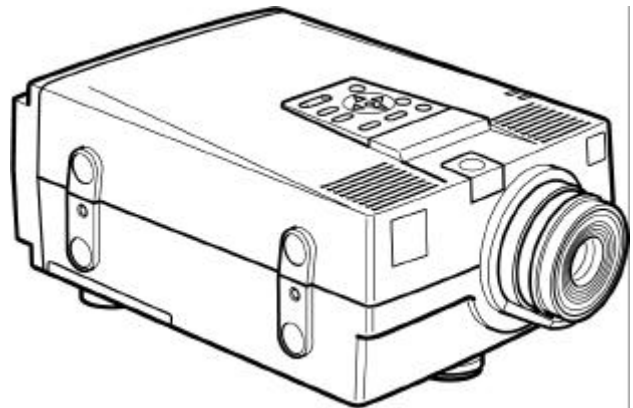


EPSON®

Service Manual

EPSON

PowerLite™
5000



Epson America, Inc.

SM-ELP-5000

PowerLite 5000

Service Manual

VCCI COMPLIANCE STATEMENT

This equipment has been tested and found to comply with the limits for Type 1 information equipment, which uses radio-frequency energy and fully complies with the specifications limiting computer information equipment in radio interference regulations (VCCI rules). If not installed and used properly according to the manufacturer's instructions, this device may cause interference to radio and television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ☐ Reorient or relocate the receiving antenna
- ☐ Increase the separation between the equipment and receiver
- ☐ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- ☐ Consult the dealer or an experienced radio/TV technician for help.

The user may find the following booklet, prepared by the Federal Communications Commission, helpful: *How to Identify and Resolve Radio-TV Interference Problems*. This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402, Stock No. 044-000-00345-4.

You can determine whether your computer is causing interference by turning it off. If the interference stops, it was probably caused by the computer or its peripheral devices. To further isolate the problem, disconnect either the peripheral device or its I/O cable.

These devices usually require a shielded cable. For EPSON peripheral devices, you can obtain the proper shielded cable from your dealer. For non-EPSON devices, contact the manufacturer or dealer for assistance.

WARNING

Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this projector. Operation with non-certified peripherals is likely to result in interference to radio and TV reception. The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels that exceed the limits established by the FCC for this equipment. Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the projector.

REVISIONS

Date	Level
May, 1997	First Release

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INTRODUCTION

This Service Manual describes hardware information necessary for field service and troubleshooting of the PowerLite 5000 Multimedia Projector. Manual updates will be supplied in service bulletins.

HOW TO USE THIS SERVICE MANUAL

The manual covers topics which may be required for field maintenance so you can use it for diagnosis of failures or repair. Before beginning maintenance work, be sure to read and observe safety precautions and rules. The contents are as follows:

- Precautions: Personal Safety, Protecting the Unit from Damage, Requirements for Servicers
- Chapter 1: Product Features (Parts of the Projector, System Functions, Specifications, etc.)
- Chapter 2: Theory of Operation (Hardware, Internal Connections, Unit Functions, etc.)
- Chapter 3: Disassembly and Assembly (Assembly Process for Main Unit and Remote Control)
- Chapter 4: Troubleshooting
- Appendix: Parts List, Assembly Drawings

PRECAUTIONS

OPERATOR SAFETY

1. PROTECTION FROM ELECTRIC SHOCK

- Before performing any repair work on the product, be sure to turn off the power switch and remove the power cable from the electrical outlet.
- Whenever it is necessary to turn the power on after opening the case or cover (for example, during the adjustment process) be sure to take off any metallic materials such as a watch, cuff links, rings, or tie pin, which may touch the metallic part of the product, creating a danger of electric shock.

2. PROTECTION FROM INJURY

- Be sure not to touch the lamp and its surroundings after the power is turned off, they may be hot. Also, be sure not to touch the light source and its surroundings during adjustments while power is turned on.
- Make sure to use gloves to protect your hands from sharp edges during assembly and disassembly.
- To protect your eyes, do not look into the light source or lens while the light is on.

3. ACCIDENT PREVENTION

- To prevent the device or its components from falling, place the device on a flat, stable surface before using it or working on it. Be careful not to place tools or parts on the device or at your feet.
- To prevent this product from being used while it is disassembled, be sure not to leave it out during any repair work, and do not place it in a location where it can be taken for use by mistake.
- Be sure to use the attached power cable to supply power to the product.

PRODUCT SAFETY

1. ELECTROSTATIC DISCHARGE

- Whenever performing repair work on the product, be sure to wear a wristband and use an electrostatic mat for grounding. When replacing any electric components (boards and optical engine), touch the electrostatic plastic bag containing the component to a metallic part of the product before taking the component out of the plastic bag.

2. RESTRICTIONS FOR PARTS REPLACEMENT

- Use only authorized or EPSON-supplied parts for replacement of mechanical components including the lamp inner housing, fuse, air filter, etc.
- Use only the power cable and interface cables supplied with the product.

3. OTHER PRECAUTIONS

- Visually check for damage or dirt on the power connectors and cable. If dirty, clean it, and if bent or damaged, replace the cable to prevent firing by the flush over phenomenon.
- When connecting the internal connector cables or interface cables, be sure to plug them into the connector fully, until they are attached to the connector edge.
- Be sure to remove the connector lock before removing the FPC cable for the light bulb. Unlock the connector lock by pulling up both ends simultaneously with tweezers.
- Whenever removing parts or repairing the product, work in a clean room, free of dust and dirt, to keep the optical elements away from dirt.

REQUIREMENTS FOR SERVICERS

Authorized servicers should have the following knowledge and skill for maintenance of the PowerLite 5000.

- Training in an EPSON-authorized maintenance training program and authorization as a service engineer.
- Sufficient understanding of the operations and descriptions in this service manual.
- Basic knowledge of electricity (safety operations, circuit diagrams, static electricity, etc.).

FURTHER INFORMATION

For questions on PowerLite 5000 maintenance, including service parts or document contents, contact the address below. Any technical information about changes will be released as necessary in the service bulletins.

EPSON AMERICA, INC.
20770 Madrona Avenue
Torrance, CA 90503
(310) 782-0770

Contents

Chapter 1 Product Features

1.1 Product Features	1-1
1.2 Parts of the Projector	1-2
1.2.1 Exterior View of Main Frame.....	1-2
1.2.2 Interior View of Main Frame	1-3
1.2.3 Exterior View of Remote Control.....	1-7
1.3 Connections.....	1-8
1.3.1 Connecting to a PC.....	1-8
1.3.2 Connecting to a Macintosh.....	1-9
1.3.3 Connecting to a Video Source	1-10
1.3.4 Connecting to an Audio Source	1-10
1.4 Main Components.....	1-11
1.5 Specifications	1-16
1.6 Interface Specifications.....	1-18
1.6.1 Computer In 1/2	1-18
1.6.2 Audio In 1/2	1-18
1.6.3 Audio Out.....	1-18
1.6.4 Monitor.....	1-19
1.6.5 S-Video.....	1-19
1.6.6 Video-In	1-20
1.6.7 Left and Right Audio Input	1-20
1.6.8 Mouse/COM 1/2.....	1-21

Chapter 2 Theory of Operation

2.1 Hardware	2-1
2.1.1 Electrical System Connections.....	2-3
2.1.2 Optical System Connections	2-4
2.2 Power Supply Unit	2-6
2.3 Main Board	2-9
2.4 Driver Board	2-12
2.5 Switch Panel.....	2-15
2.6 AU Board.....	2-16
2.7 FR Board	2-18
2.8 CN Board.....	2-20
2.9 Receptor Board	2-21
2.10 Speaker Unit.....	2-23
2.11 Light Guide Unit.....	2-24
2.12 Lamp Inner Housing	2-26
2.13 Sensors/Switches	2-29

2.13.1 Filter Cover Switch.....	2-30
2.13.2 Interlock Switch.....	2-31
2.13.3 Safety Switch.....	2-31
2.13.4 Lamp Thermistor.....	2-32
2.13.5 LV Thermistor	2-32
2.13.6 PBS Thermistor	2-33
2.14 Board Connections	2-34

Chapter 3 Disassembly and Assembly

3.1 Disassembly and Assembly Procedures	3-1
3.1.1 Preparatory Procedures.....	3-1
3.1.2 Required Tools and Accessories.....	3-1
3.1.3 Limitations of Disassembly (Optical Engine Handling)	3-1
3.2 Disassembling and Assembling the Projector Main Unit	3-5
3.2.1 Removing the Lamp Inner Housing.....	3-6
3.2.2 Removing the Air Filter Frame	3-7
3.2.3 Removing the Upper Case Unit and Handle	3-8
3.2.4 Removing the Rear Case Unit Assembly	3-10
3.2.5 Removing the A/B Foot Adjuster.....	3-11
3.2.6 Removing the Switch Panel	3-12
3.2.7 Removing the Speakers.....	3-13
3.2.8 Removing the Main Board.....	3-14
3.2.9 Removing the AU Board	3-16
3.2.10 Removing the Receptor Board Assembly (FI Board/RI Board)	3-17
3.2.11 Removing the FR Board	3-19
3.2.12 Removing the Power Supply Unit/PBS Thermistor.....	3-20
3.2.13 Removing the Driver Board Assembly.....	3-24
3.2.14 Removing the Lamp Thermistor	3-22
3.2.16 Removing the Safety Switch	3-23
3.2.17 Removing the Optical Engine.....	3-24
3.2.18 Removing the Filter Board	3-25
3.2.19 Removing the Inlet Unit.....	3-26
3.2.20 Removing the CN Board	3-27
3.2.21 Removing the Air Filter Frame Unit Switch (Filter Cover Switch)	3-28
3.2.22 Removing the FC Board	3-29
3.2.23 Removing the Projection Lens Unit (PLU).....	3-24

CHAPTER 4 TROUBLESHOOTING

4.1 Before Starting Troubleshooting Procedures 4-1

 4.1.1 Tools and Accessories Required for Troubleshooting 4-1

 4.1.2 Field Replacement Parts.....4-1

4.2 First Action 4-2

APPENDIX A

A.1 Parts List A-1

A.2 Exploded Diagrams A-4

1.1 PRODUCT FEATURES

The PowerLite 5000 multimedia projector is a portable, easy-to-use presentation device with an SVGA resolution. It projects enhanced color images from personal computers and from video equipment such as VCRs, camcorders, and digital cameras.

Features

- ❑ **Light weight, compact, portable**
The new structure minimizes the projector to page size with a weight of only 14.1 lb (6.4 kg). An optional carrying case is available for transporting the projector.
- ❑ **Bright and clear images**
The high performance zoom lens, new, bright lamp (400 lm. ANSI), and optical block provide a wide image of 21" to 300" (1.2 to 12.3 m). An optional brightness screen provides clear images, even with bright ambient light.
- ❑ **High resolution full color (16770 thousand colors)**
Three (R, G, and B) TN liquid crystal panels of 480,000 pixels support an SVGA resolution of 800 x 600. The grid between pixels in the liquid crystal panel is thinner than that of conventional projectors, providing sharp contrast.
- ❑ **Remote control**
You can control the projector using a hand-held remote control unit that has menus for image source switching and image adjustment. The remote control can also work as a wireless mouse during presentations. The ELP LINK II™ software has add-on features that make presentations effective.
- ❑ **Connectivity with various types of computers**
The projector can connect to various types of computers such as IBM-compatible PCs, laptops, and Macintosh computers. It also differentiates NTSC, PAL, or SECAM video signals in composite video or S-Video format.
- ❑ **Advanced Image Real-time Resizer**
The projector features a new, patent-pending SizeWise chip that supports SVGA computer output, as well as VGA and XGA output. No matter what type of output is used, the result is a full-size video image of outstanding clarity.
- ❑ **Automatic video tracking**
A totally new AVTSS™ (Automatic Video Tracking and Synchronization Sensing, patent pending) feature provides automatic setup of images from the computer with a touch of the AUTO button for quick and easy projection of images.
- ❑ **Simple maintenance**
The maintenance is easy. The image adjustment process has been minimized.
- ❑ **Theft - proof**
A Kensington lock that attaches to the lower case is available.

1.2 PARTS OF THE PROJECTOR

1.2.1 Exterior View of Main Frame

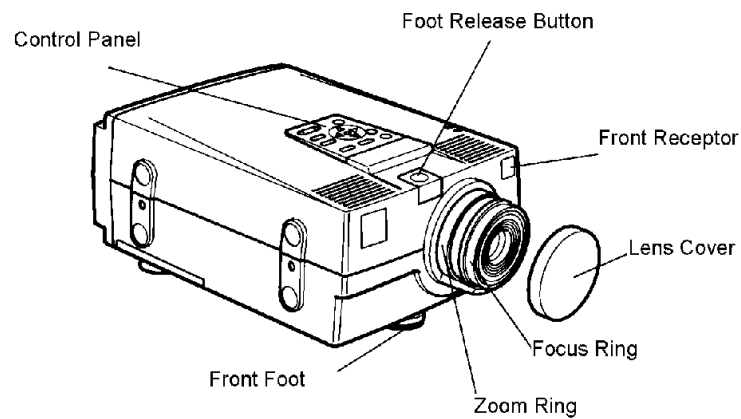


Figure 1-1

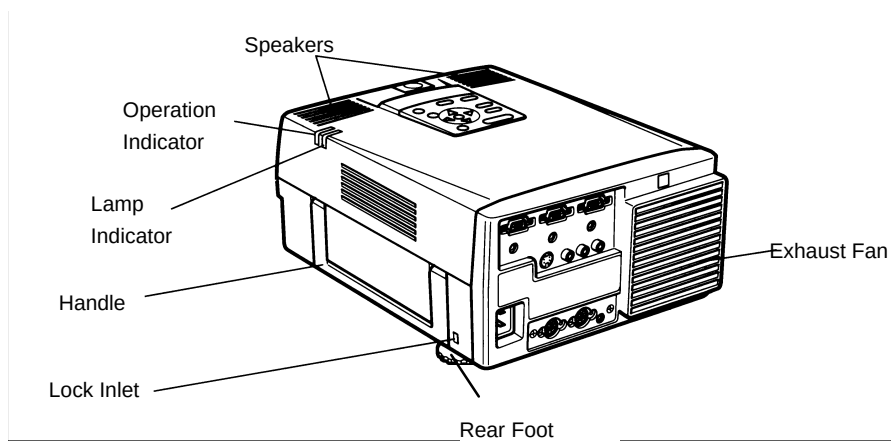


Figure 1-2

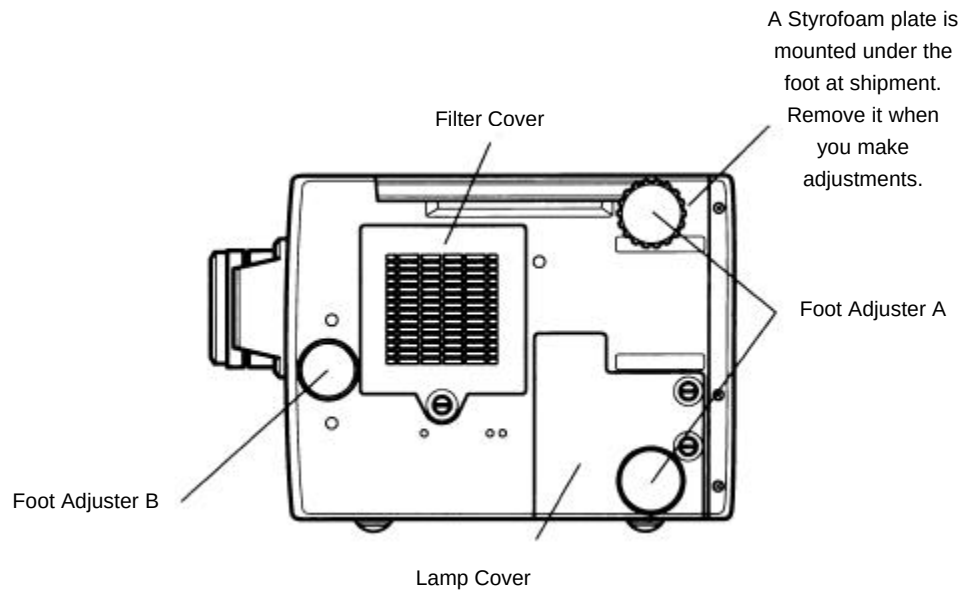


Figure 1-3

1.2.2 Interior View of Main Frame

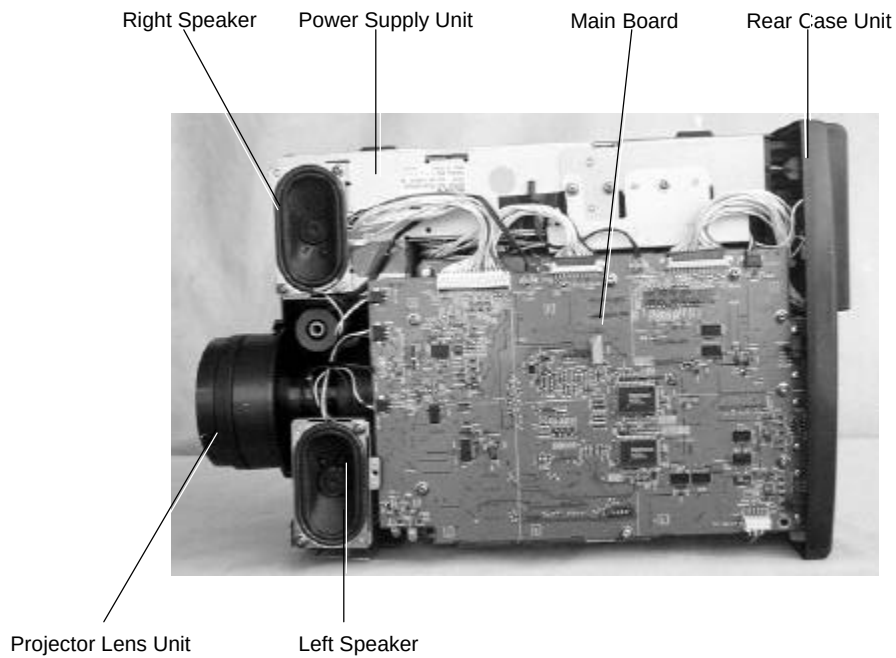


Figure 1-4

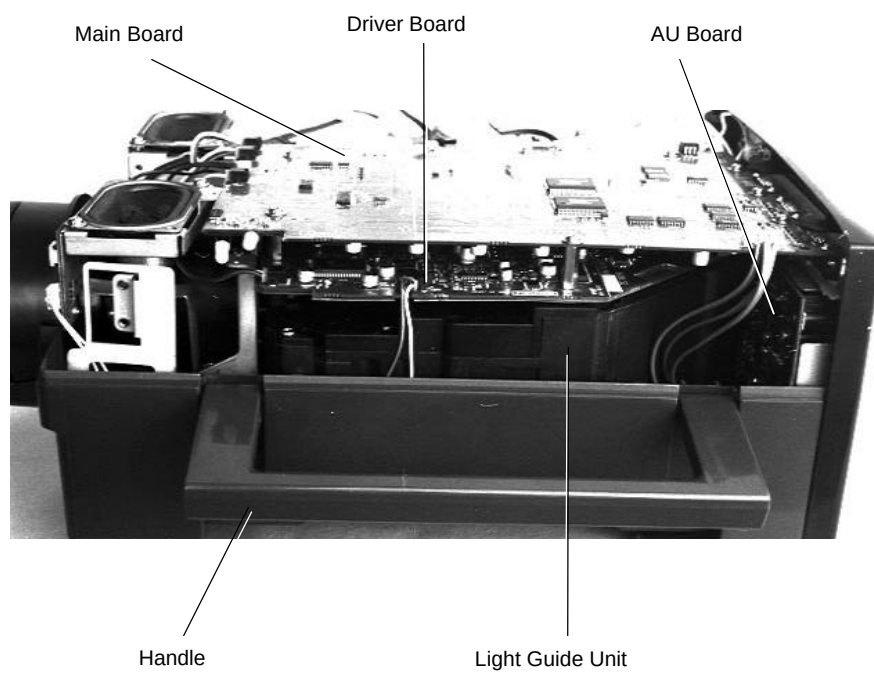


Figure 1-5

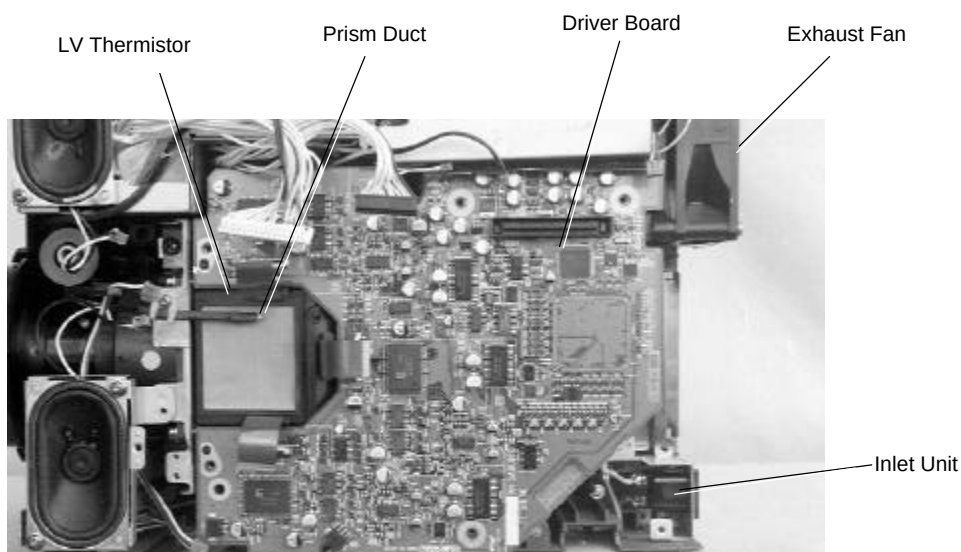


Figure 1-6

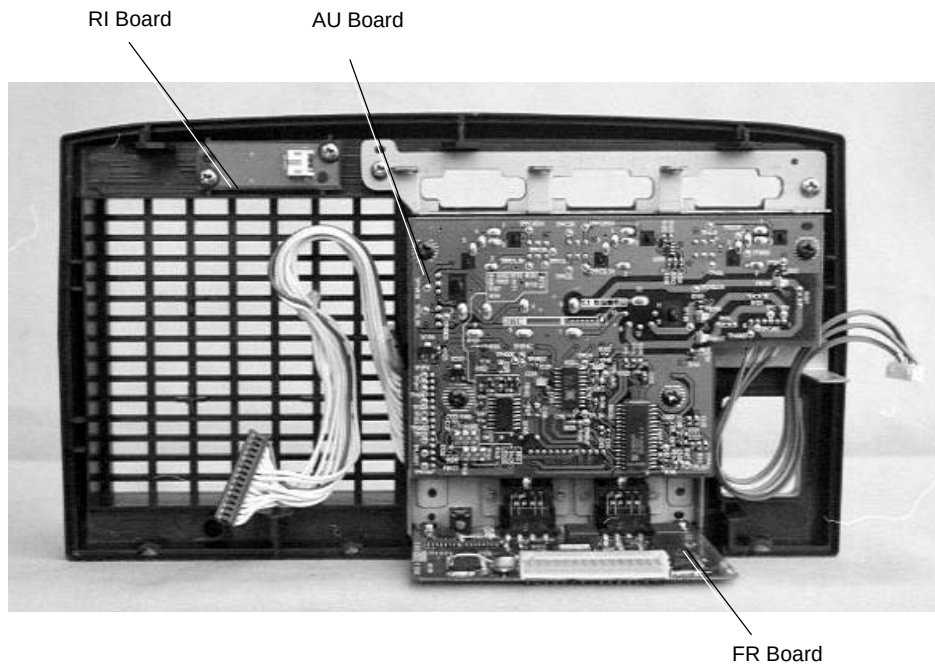


Figure 1-7

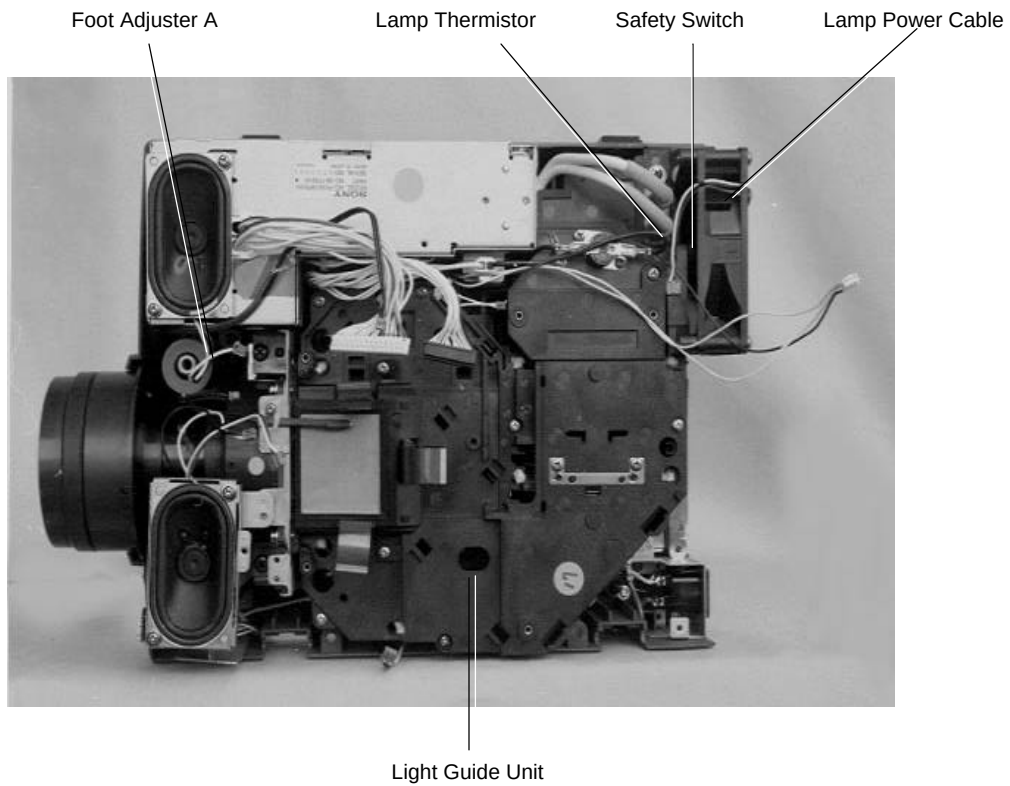


Figure 1-8

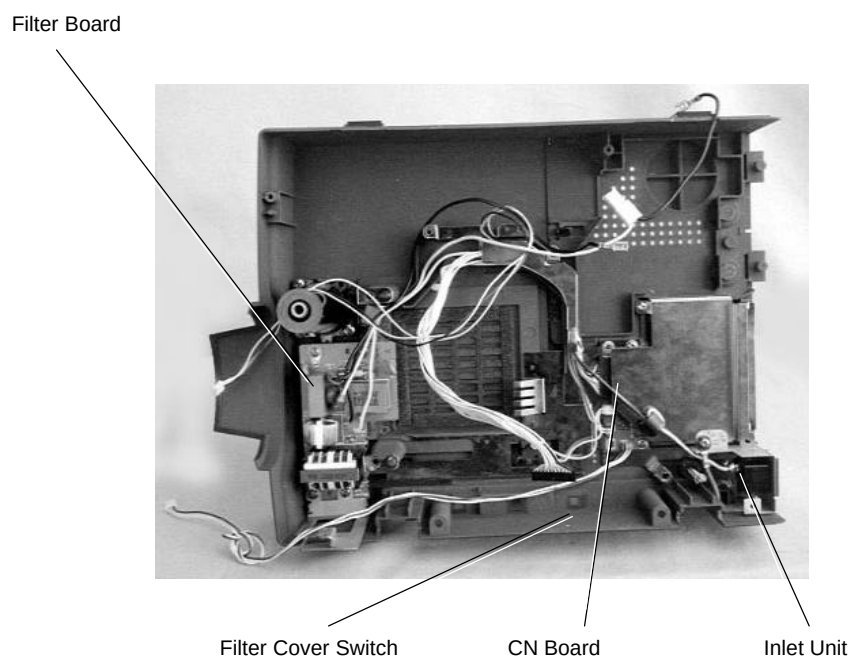


Figure 1-9

1.2.3 Exterior View of Remote Control

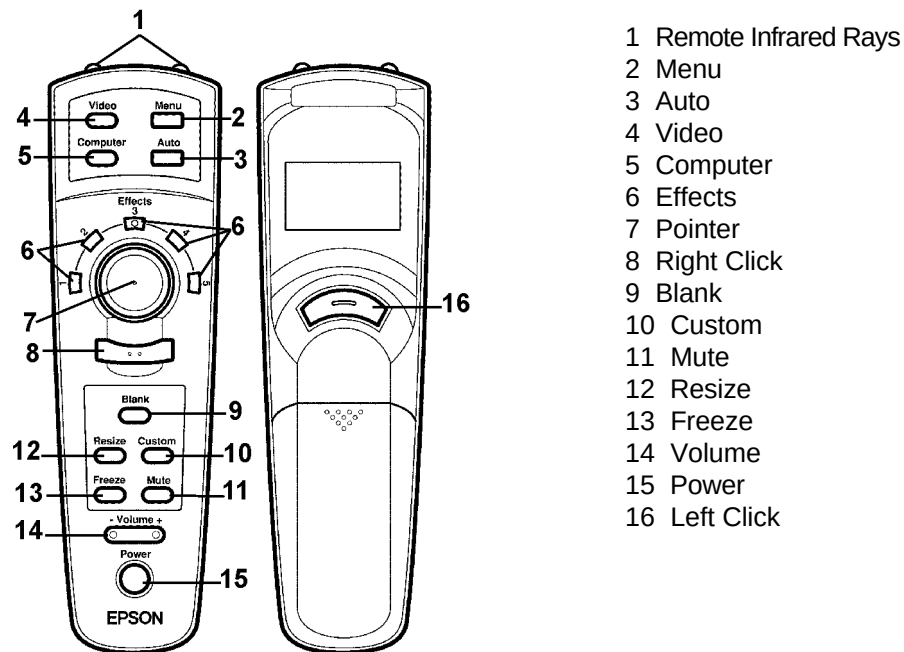


Figure 1-10

1.3 CONNECTIONS

1.3.1 Connecting to a PC

Desktop

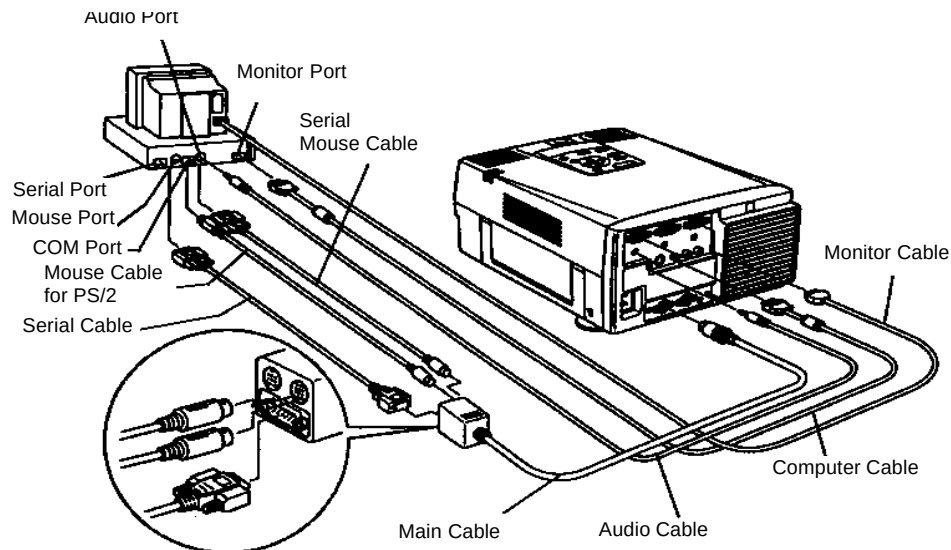


Figure 1-11

Laptop

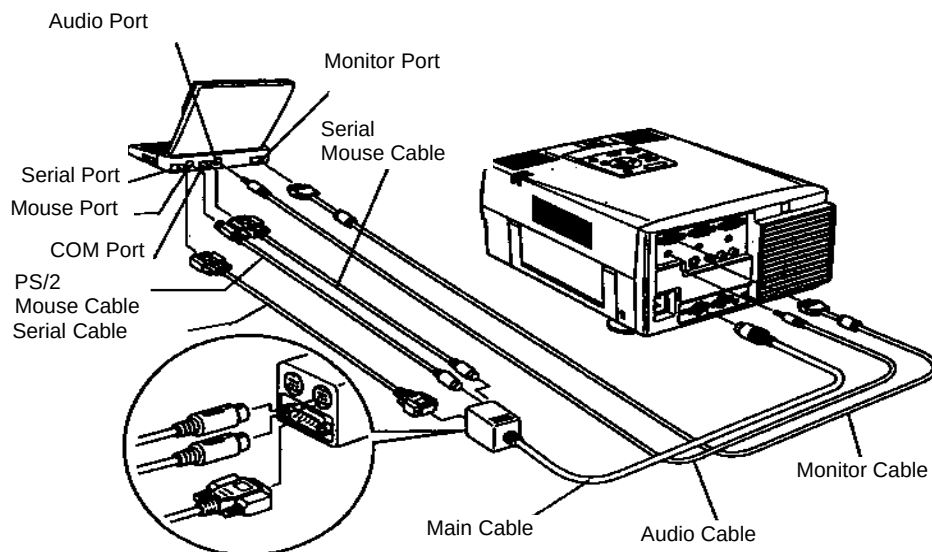


Figure 1-12

1.3.2 Connecting to a Macintosh

Desktop

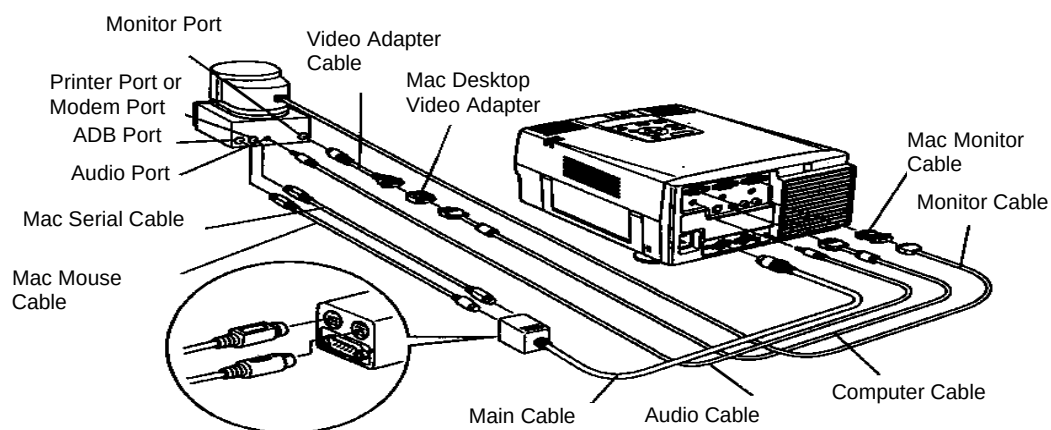


Figure 1-13

Note:

Dip switch settings change according to the machine type. Refer to the following monitor adapter table for details. (The default setting is Mac13" mode.)

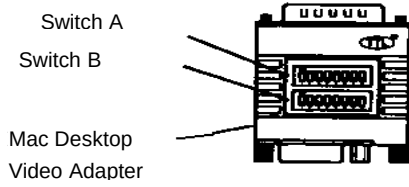


Figure 1-14

Table 1-1

Resolution	Top Row (A)	Bottom Row (B)
VGA	3, 4, 5	8
13" 640 × 480	1, 2, 5	8
16" 832 × 624	2, 4, 5	8
19" 1024 × 768	2, 3, 5	8
21" 1152 × 870	1, 2, 3, 4, 5	8
13" Multi Res.	1, 2, 5	8
14" Multi Res.	1, 2, 5	3, 4, 8
17" Multi Res.	1, 2, 5	3, 8/4, 8
21" Multi Res.	1, 2, 5	3, 8

Power Book

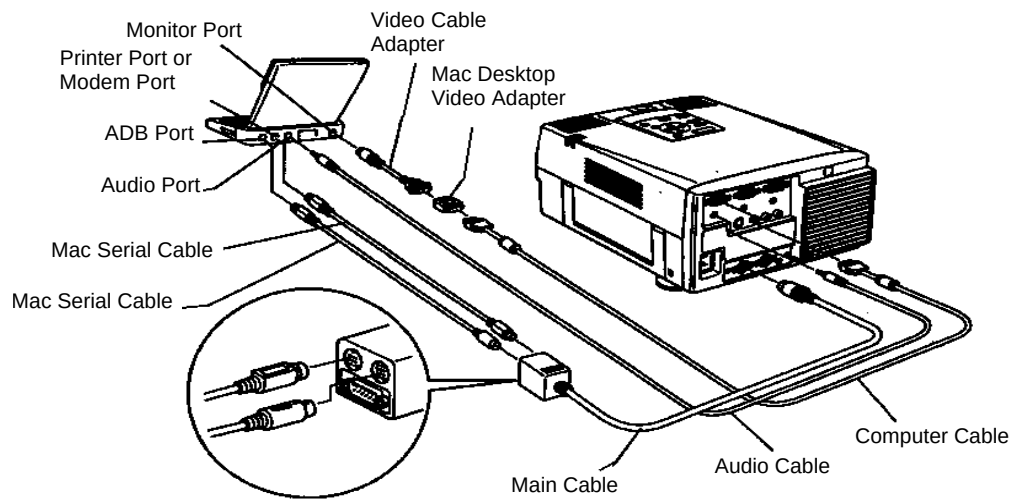


Figure 1-15

1.3.3 Connecting to a Video Source

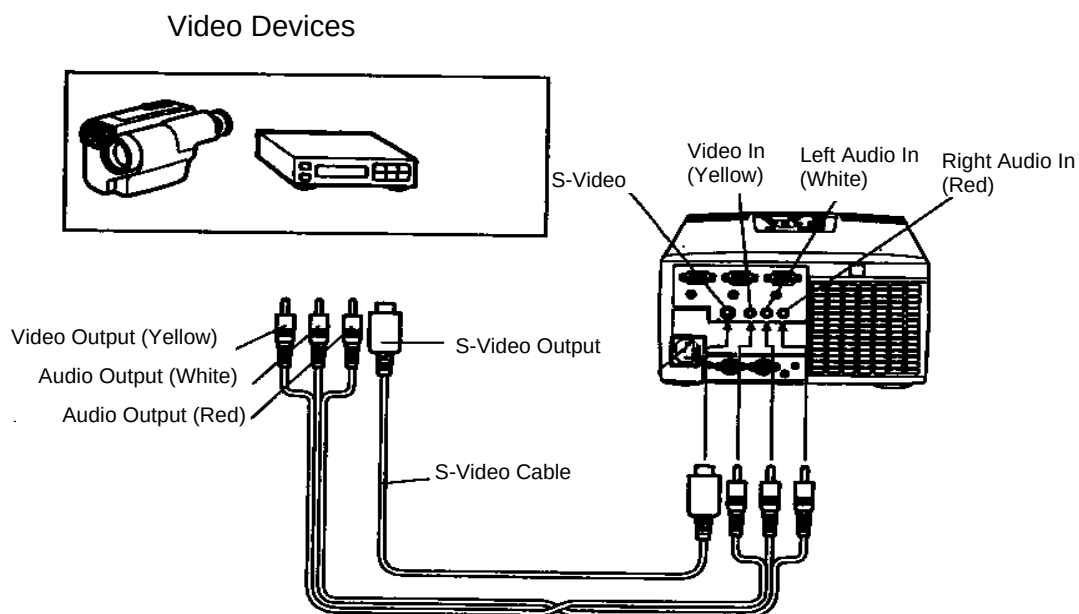


Figure 1-16

1.3.4 Connecting to an Audio Source

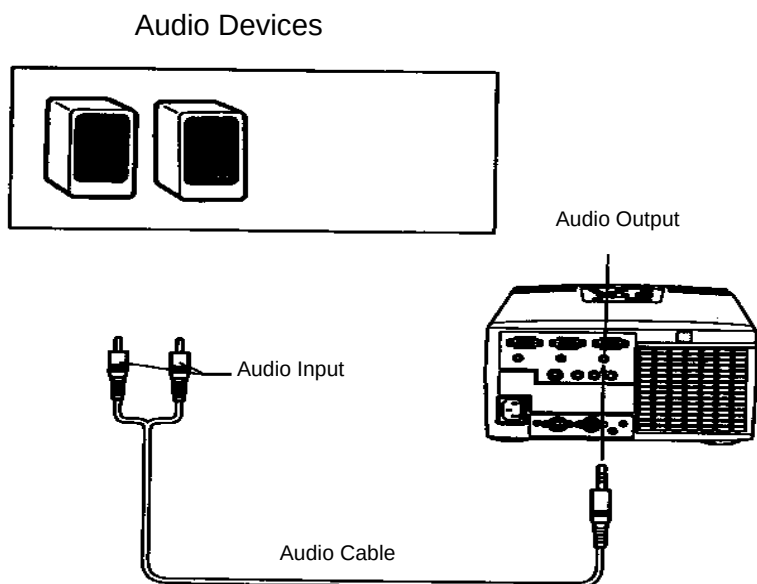


Figure 1-17

1.4 MAIN COMPONENTS

Main board

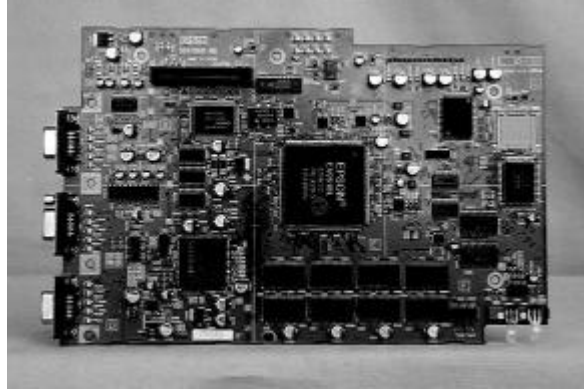


Figure 1-18

Driver board

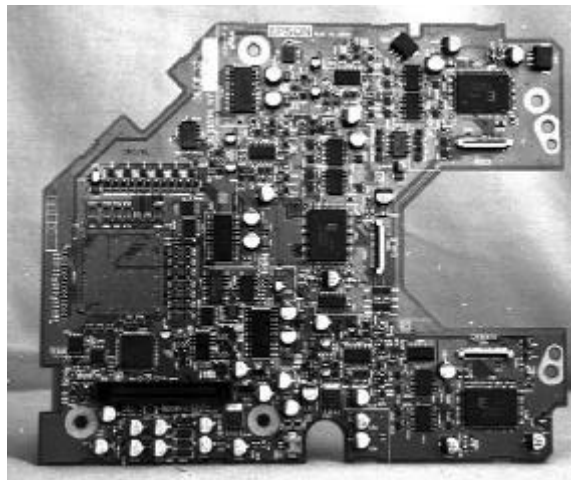


Figure 1-19

AU board

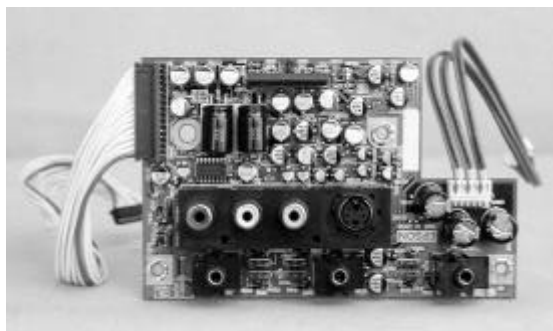


Figure 1-20

FR board

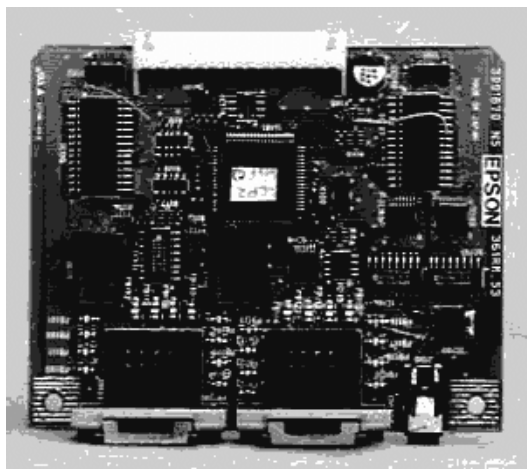


Figure 1-21

CN board

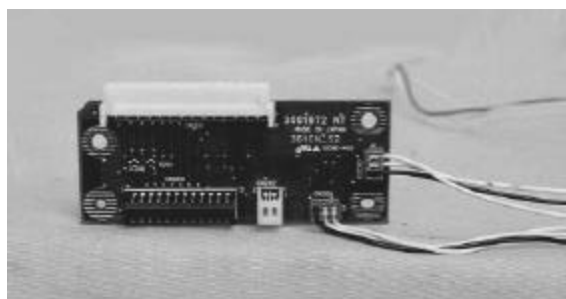


Figure 1-22

Receptor boards

RI board

FI board

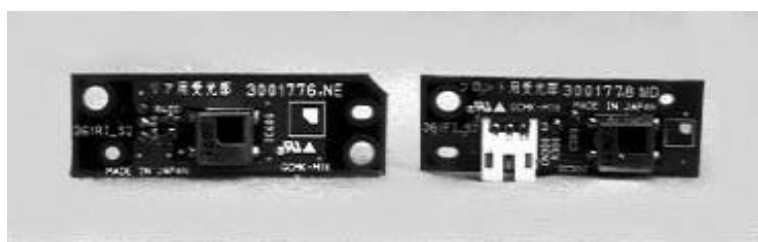


Figure 1-23

Speakers

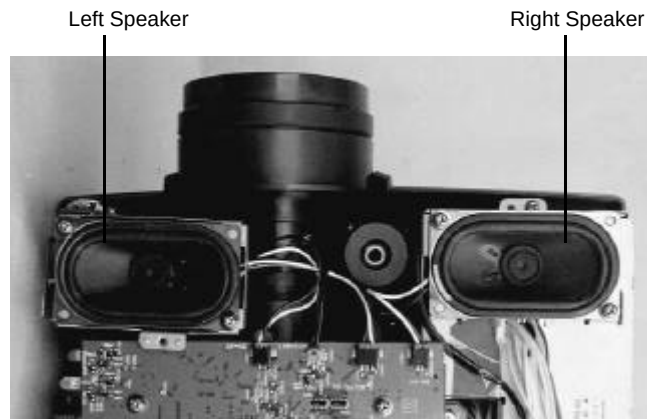


Figure 1-24

Inlet unit

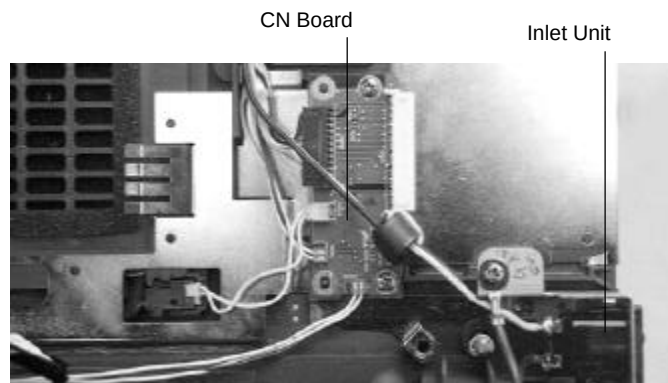


Figure 1-25

Filter unit

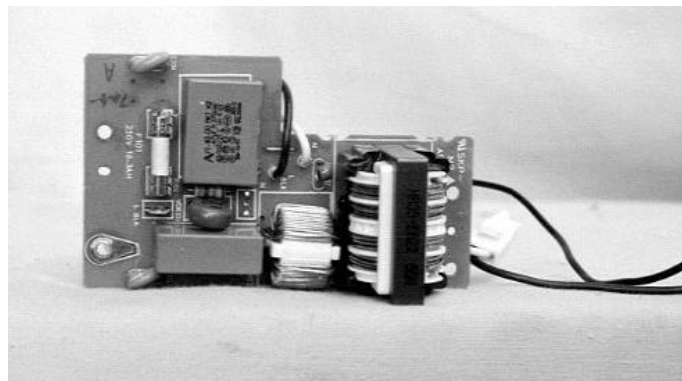


Figure 1-26

Power supply unit

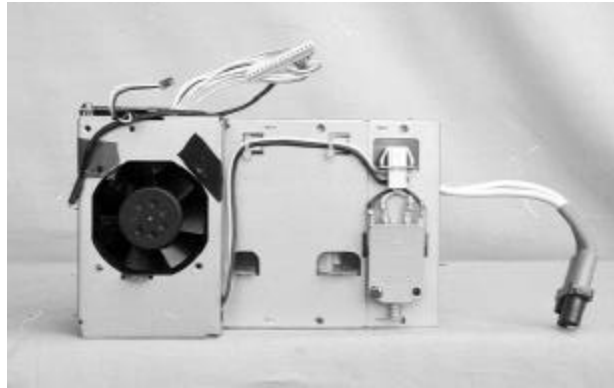


Figure 1-27

Lamp inner housing

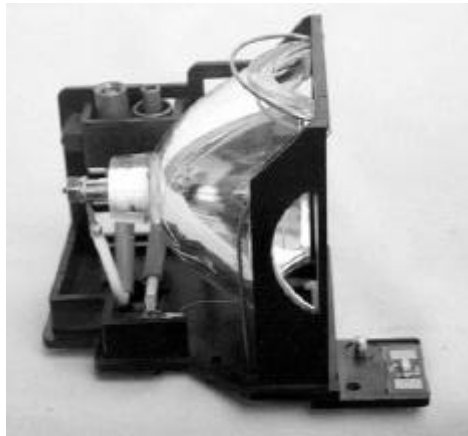


Figure 1-28

Control panel

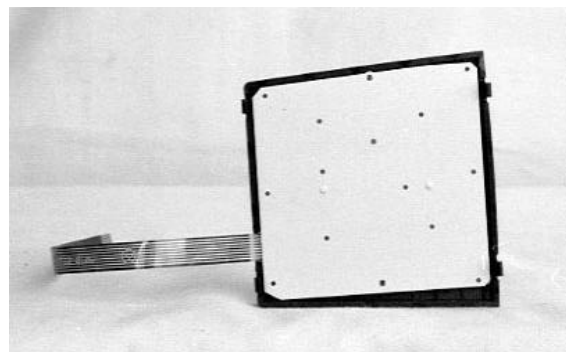


Figure 1-29

Optical engine

Top side view

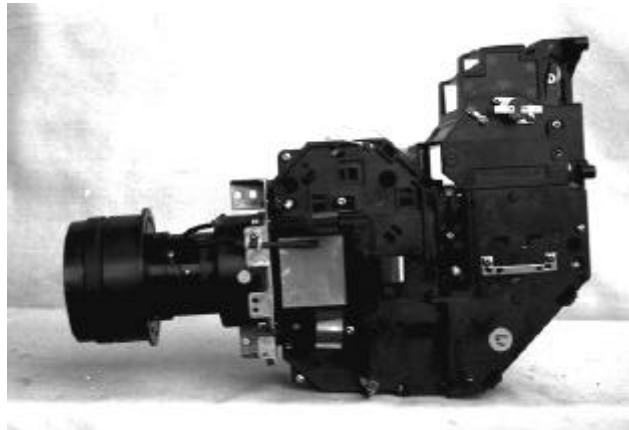


Figure 1-30

Bottom side view

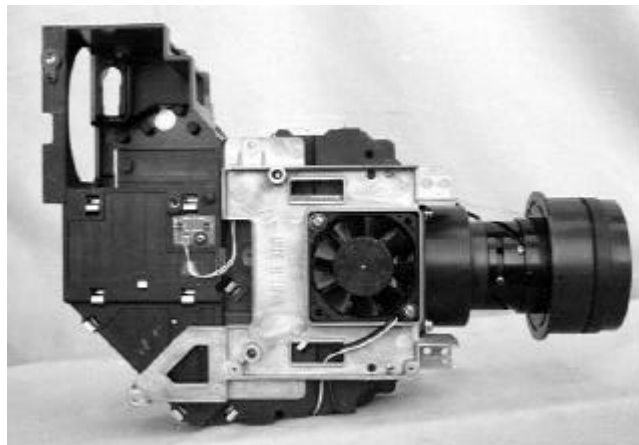


Figure 1-31

1.5 SPECIFICATIONS

Table 1-2

OPTICAL FEATURES	
Display method	Transparency type poly-silicon TFT color liquid crystal display with three panels (R/G/B)
Optical method	Diachronic mirror separation and prism combination methods
Projection image size	Minimum 21 inches to maximum 300 inches (0.6 m to 7 m)
Projection distance	3.94 feet to 40.35 feet (1.2 m to 12.3 m)
Resolution	800 x 600 dots; 1,440,000 pixels (480,000 x 3)
Projection Lens	Zoom lens F2.5 - 2.9 (55-77 mm)
Focus adjustment	Manual
Zooming adjustment	Manual (1:1.3)
Light Source Life (Lamp inner housing)	150 W - 350 V, Metal halide lamp, (type ELPLP03) 2000 hours
Average luminance	340 lumens (ANSI)
AUDIO FEATURES	
Internal speakers	Built-in speakers (2W-4Ω) x 2 (stereo)
Output for audio out Interface	External speaker 3.5 mm Stereo mini-jack Internal speaker output is stopped when mini-jack is plugged in. Output signal: 0 to 500 mVrms load impedance: 600Ω
Left and right Audio In interface (For video device)	Audio signal (stereo) from the video devices. Input interface is separated into right and left. Interface type: RCA jack Input signal: 500 mVrms
Audio IN 1 interface (For Computer In 1)	Host computer 1 audio input (stereo) Interface type: 3.5 mm stereo mini-jack Input signal: 500 mVrms/47KΩ
Audio IN 2 interface (For Computer In 2)	Host computer 1 audio input (stereo) Interface type: 3.5 mm stereo mini-jack Input signal: 500 mVrms/47KΩ
REMOTE CONTROL	
Wireless remote control	Controls the projector operating mode and the host computer. The signal is detected by an internal receptor board. Control range: Within 33 feet (10 m) and 30 degrees of the projector receptor.

VIDEO INPUT/OUTPUT	
Computer In 1 interface	Host computer 1 RGB output
Computer In 2 interface	Interface type: HD-15-pin (DDC1/2B compatible)
S-Video Interface	Input signal: Luminous 0.714 Vp-p, Chrominous 0.28 Vp-p. Interface type: Min-DIN 4-pin S-Video is prior to composite video.p.
Video IN Interface (Composite video interface)	Input signal: 1,0 Vp-p, sync, negative Interface type: RCA jack (yellow) TV signal type: NTSC 3.58 MHz PAL 4.43 MHz SECAM 4.43 MHz Auto identification (default)
MOUSE/COM 1/2	
Serial Mouse or RS-232C	Auto identification (Mouse or RS-232C) Interface type: 13-pin DIN
POWER SUPPLY	
Input Voltage	100 – 120 VAC /220 – 240 VAC $\pm$ 10% (50/60 Hz)
Power Consumption	Approximately 240 W (standby mode: 30 W)
Dimensions	9.7 (W) x 5.5 (H) x 12.4 (D) inches (245 (W) x 140 (H) x 316 (D) mm) 9.7 (W) x 6.3 (H) x 15.0 (D) inches including foot adjuster and lens (245 (W) x 159 (H) x 380 (D) mm)
Weight	Approximately 14.1 lb (6.4 kg)
ENVIRONMENT	
Operational/ storage temperature	+39°F ~ 104°F/ +14°F ~ 140°F (+5°C ~ +40°C/ -10°C ~ +60°C) (non condensing)
Operational/ storage humidity	20%~ 80% / 10%~ 90% (non condensing)
Operational/ storage altitude	10,000 feet (3048 m) / 20,000 feet (6096 m)

1.6 INTERFACE SPECIFICATIONS

1.6.1 Computer In 1/2

Computer video input D-SUB 15 (HD)

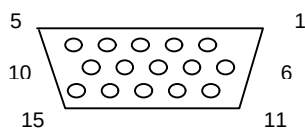


Figure 1-32

Table 1-3

Pin	Terminal	Pin	Terminal
1	Red video	9	+5V
2	Green video	10	Synchronous GND
3	Blue video	11	Monitor (ID bit 0)
4	Monitor (ID bit 2)	12	SDA
5	GND	13	Horizontal synchronization
6	Red video GND	14	Vertical synchronization
7	Green video GND	15	SCL
8	Blue video GND		

1.6.2 Audio In 1/2

Stereo mini jack with 2 circuits for detection pin

(The detection pin, which is not required for audio input, is installed for the audio out terminal.)

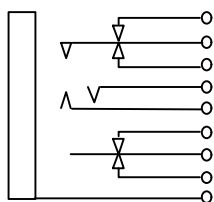


Figure 1-33

Table 1-4

Pin number	Signal
1	GND
2	Computer audio input L
3	Computer audio input R
Others	NC

1.6.3 Audio Out

Stereo mini jack with two circuits for detection pins

Table 1-5

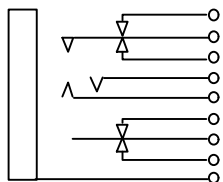


Figure 1-34

Pin number	Signal
1	GND
2	Audio output L
3	Audio output R
4	GND
5	Detection of line-out jack insertion
Others	NC

1.6.4 Monitor

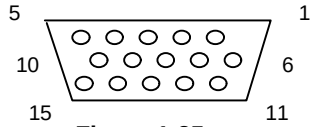


Figure 1-35

Table 1-6

Pin	Signal	Function
1	R Out	Red video
2	G Out	Green video
3	B Out	Blue video
4	Reserved	
5	GND	
6	GND	
7	GND	
8	GND	
9	Reserved	
10	GND	
11	Reserved	
12	Reserved	
13	H sync	Horizontal synchronization
14	V sync	Vertical synchronization
15	V sync	

1.6.5 S-Video

S-terminal input

Mini DIN 4-pin with a detection pin

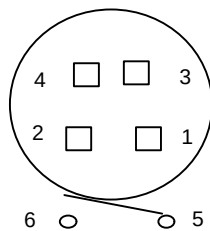


Figure 1-36

Table 1-7

Pin number	Signal
1	GND
2	GND
3	Y signal input
4	C signal input
5	Input detection terminal
6	GND

1.6.6 Video-In

RCA gold plating (only insertion part), Light angle H=15 mm

Color: yellow

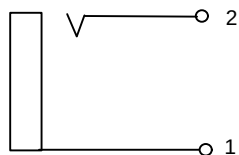


Table 1-8

Pin number	Signal
1	GND
2	Video input

Figure 1-37

1.6.7 Audio In L/R

RCA Gold plating (only insertion part), Light angle H = 15 mm

Color: L = white R = red

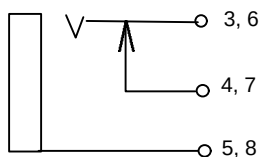


Table 1-9

Pin number	Signal
3	GND
4	Audio R return
5	Audio input L
6	GND
7	Audio L return
8	Audio input R

Figure 1-38

1.6.8 Mouse / Com 1/2

Multi-mouse, 13 pin jack

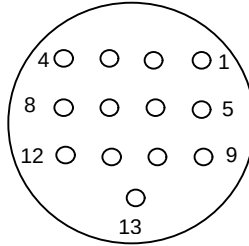


Figure 1-39

Table 1-10

Pin	Signal	Type	Functions
1	XA/CLK/ADB		Encoder signal//I/O data signal/Synchronous clock signal
2	XB/DATA		Encoder signal//I/O data signal
3	YA		Encoder signal
4	YB		Encoder signal
5	LEFT/ID0		Left button signal/Control signal
6	RIGHT/ID1		Right button signal/Control signal
7	NC	Common	Disabled
8	TxD	Serial	Transmitted signal
9	RxD	Serial	Received signal
10	DTR	Serial	LCP data terminal ready signal
11	DSR	Serial	PC data set ready signal
12		Common	PC power ON signal
13	GHD	Common	Ground

2.1 HARDWARE

The optical and electrical systems are the major areas of projector hardware.

The lower level (below the broken line in the figure) shows the optical system, and the upper level shows the electrical system.

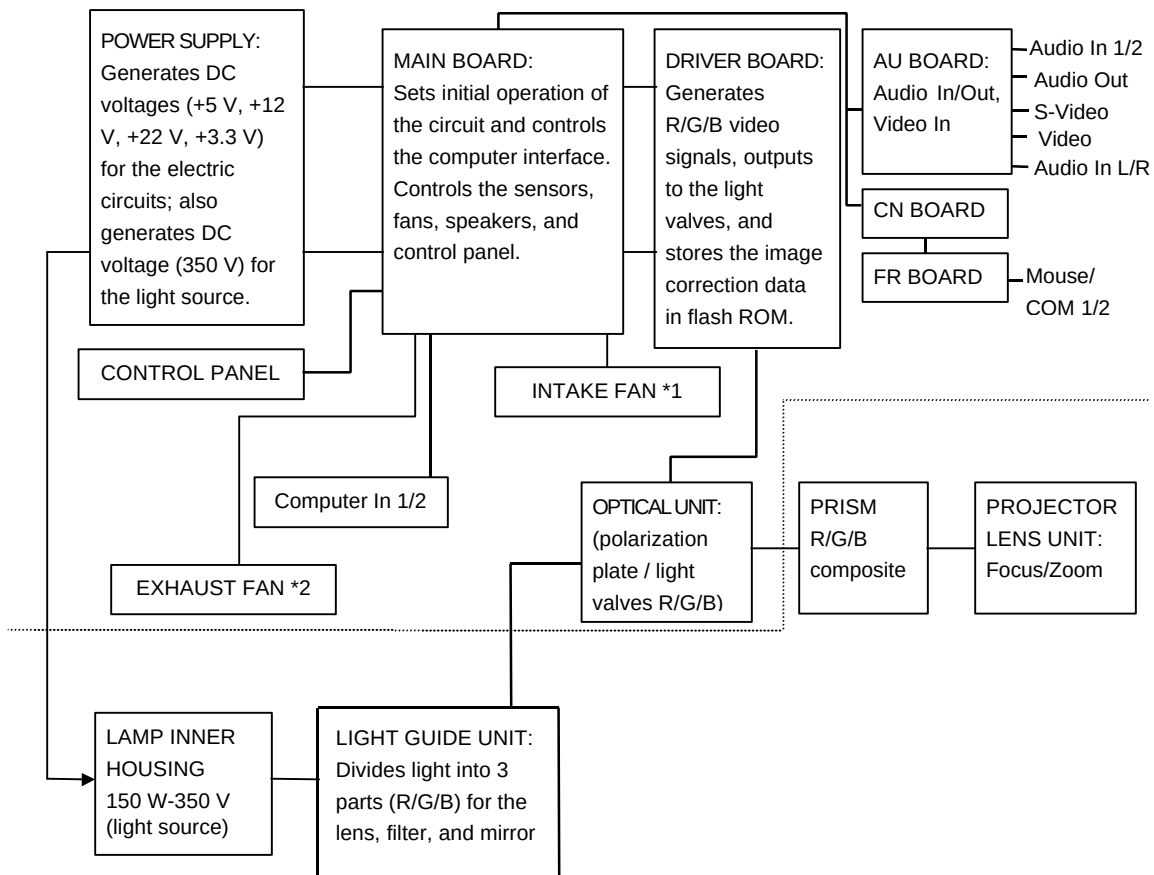


Figure 2-1

Notes:

*1: The intake fan cools the R/G/B light valves (LCD panel).

*2: The exhaust fan removes hot air around the light source.

Description of the Projection Process

1. The digital or analog R/G/B signal is provided from a computer (1 or 2) to the main board. Analog signals (S-Video or Video signals) are sent to the main board through the AU board. (Analog signals are converted into digital signals by the main board.)
2. The digital video signal is then stored in video memory (SRAM) on the main board. Then the driver board generates signals to drive the R/G/B light valves.
3. The R/G/B light valves are individual panels, independent of each other. They work to shut off or transmit lights from the light guide unit.
4. Lights transmitted through the light valves are combined by a prism and projected through the lens unit.

2.1.1 Electrical System Connections

Electrical units are physically connected to the main board as shown below.

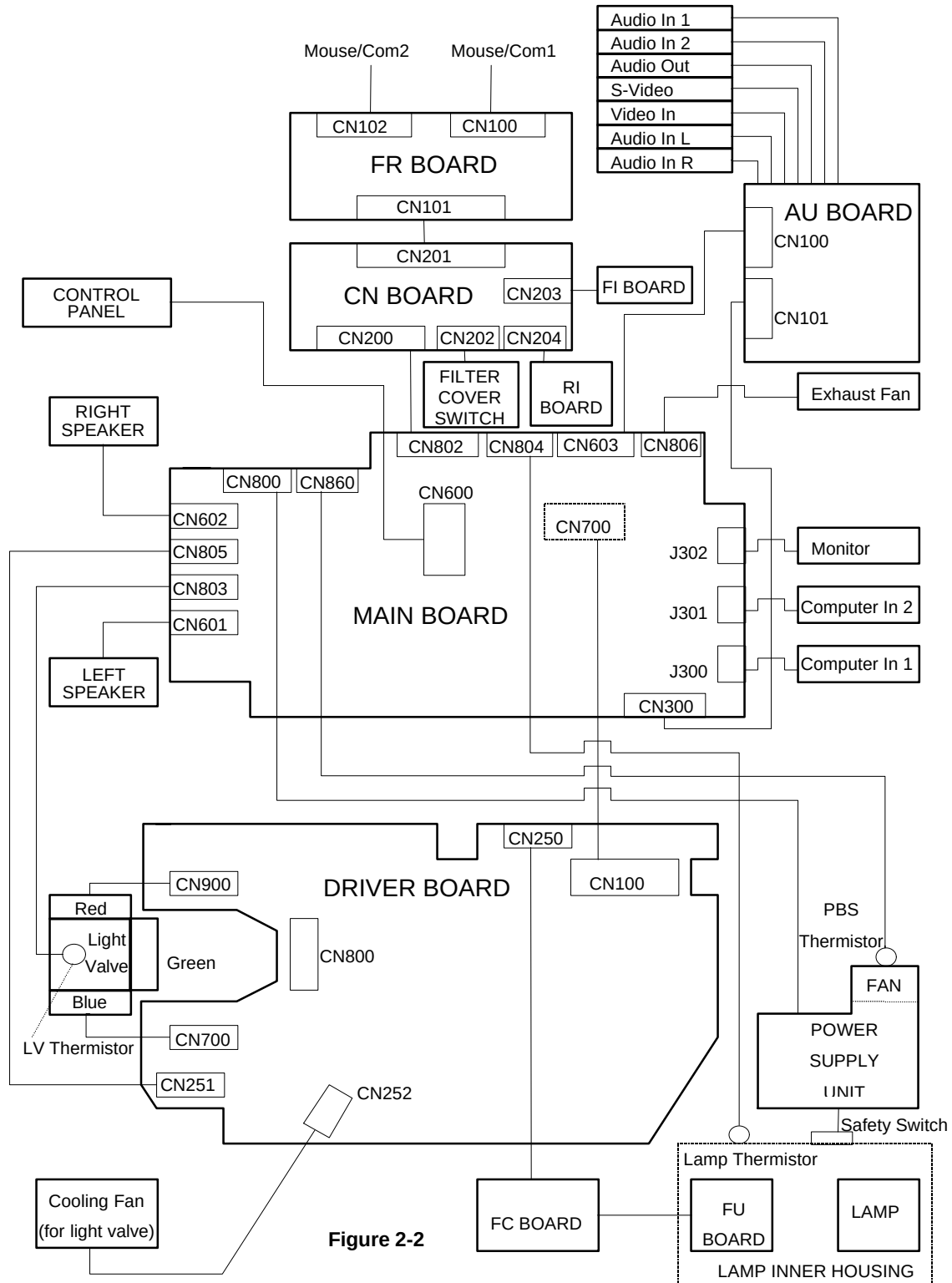


Figure 2-2

2.1.2 Optical System Connections (Optical Engine)

The optical system consists of 5 blocks: the lamp inner housing, light guide unit, optical head/prism unit, and projector lens unit, which are shown below, and the driver board. These units are specified as the optical engine, which is one replaceable part. In addition to these five items, the FC board is attached at the bottom of the light guide unit. The relay board connects the FC board in the lamp inner housing to the driver board. It is independent of the optical functions.

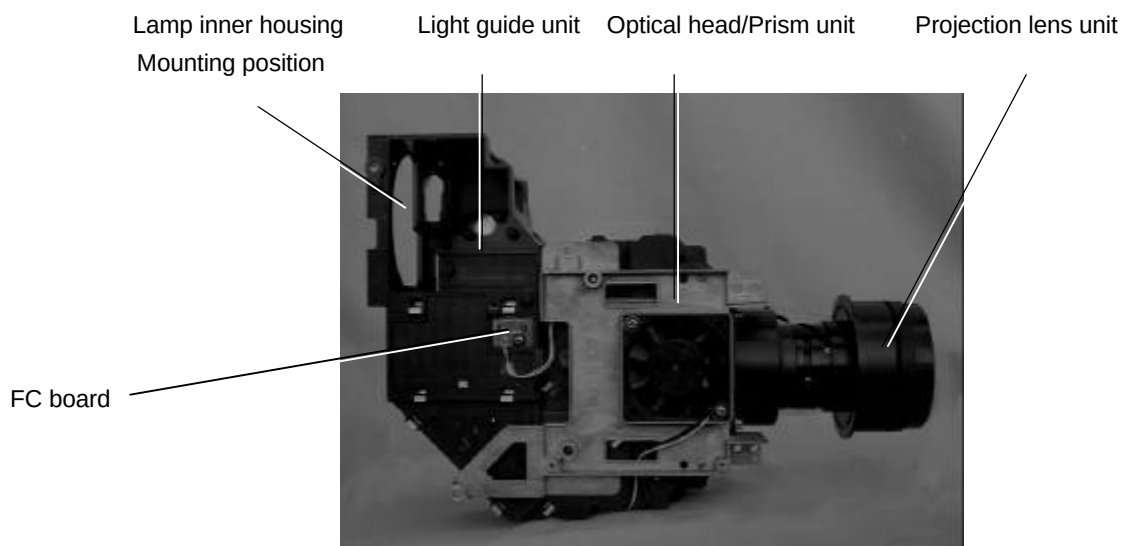


Figure 2-3

Inside View of the Light Guide Unit

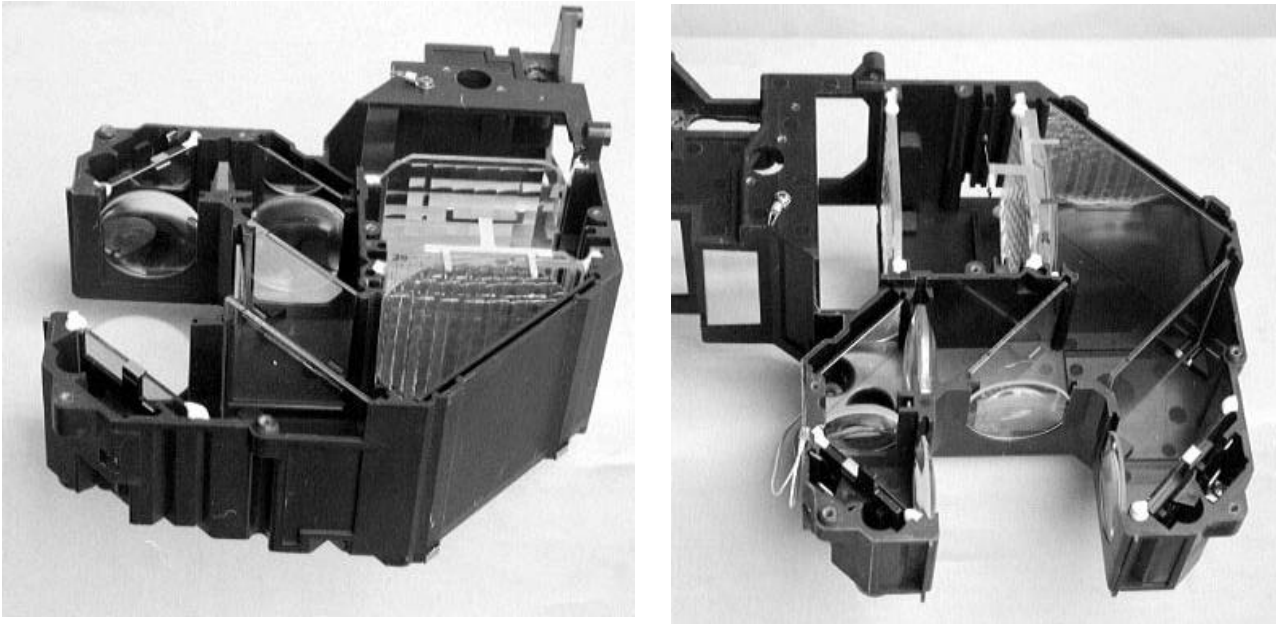


Figure 2-4

Caution:

Do not cause any shock or mechanical stress to the optical engine or disassemble it. Otherwise, pixel divergence may occur. The alignment is adjusted in the factory, and specific electrical correction is made on the driver board for each optical engine.

Table 2-1

UNIT NAME	FUNCTION AND REMARKS
Lamp Inner Housing	Includes one metal halide lamp as a light source. The FU board is mounted for lamp inner housing detection.
Light Guide Unit	Disperses the light from the light source uniformly using an A/B lens array. (Ultraviolet rays are also eliminated.) Disperses the light in three parts(R/G/B), for the condenser lens and mirror.
Projector Lens	Zoom (*1.3) and focus adjustments
Optical Head/Prism Unit	Consists of three light valves, a polarization plate, and a prism unit. Each light valve controls the shutter of pixels with six levels. The prism unit creates R/G/B optical signals and transfers them to the projector lens unit.

Note:

The light guide unit, optical head/ prism unit, projector lens unit, and driver board are treated as one part named the optical engine.

2.2 POWER SUPPLY UNIT

The power supply unit includes a DC regulator, intake fan, and interlock switch for the lamp cover. This unit generates the voltages for the control circuit (+3.3 V, +5 V, +12 V, +22 V) and for the light source lamp (+350 V) from AC input.

The PBS thermistor is installed on the side of the power supply intake fan and is retained with a clamp on the power supply unit. It detects the temperature. If it senses overheating, it shuts off the regulator output via the main board. Although a functional diagram is shown below, never disassemble the power supply unit at field maintenance service.

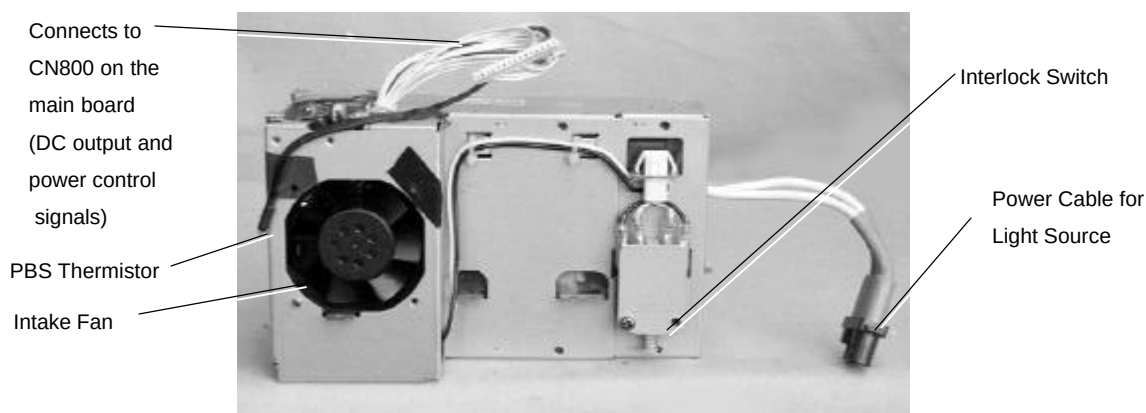


Figure 2-5

Functional Block

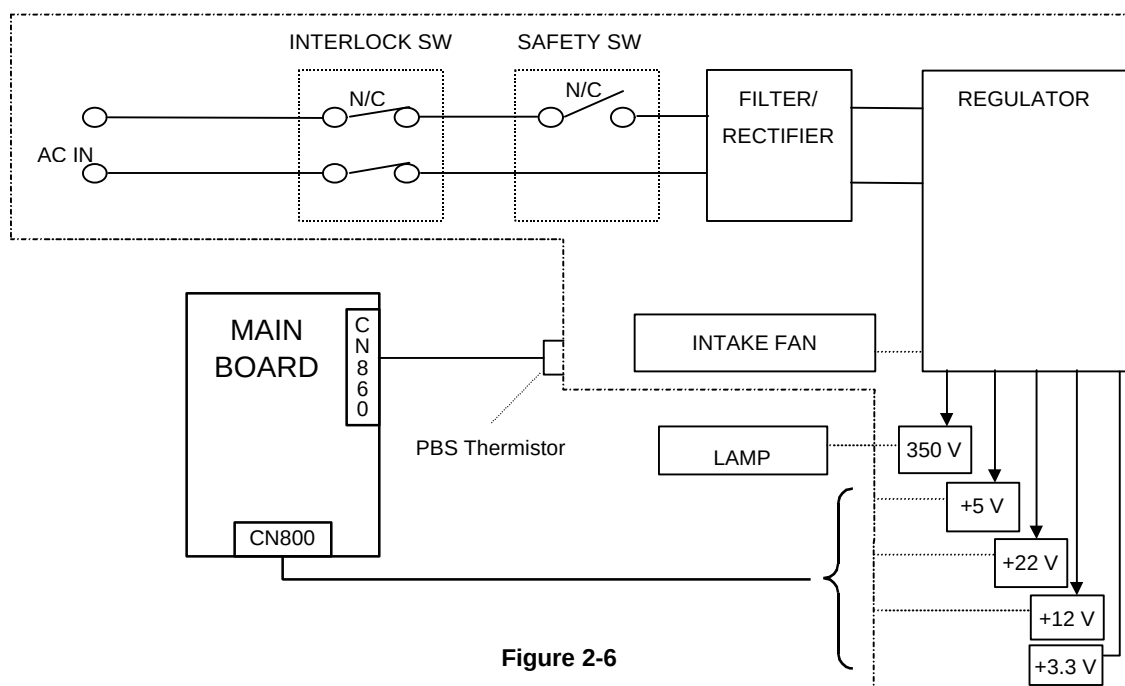


Figure 2-6

- An interlock switch is included for safety. The interlock switch shuts off the supply of AC power if the lamp cover at the bottom of the main chassis is open.
- The safety switch input signal stops power output to the light source lamp if the projector detects overheating. The safety switch is mounted on the light guide unit attached to the lamp inner housing.

Functional Outline

- The interlock switch at the bottom of the main chassis shuts off power when the lamp cover is opened. It is normally at the ON position.
- The power supply cable is connected to CN800 on the main board. The following items are also connected to CN800:
 - DC output line
 - PWDS signal for the power on/off control
 - Lamp power on/off control signal (LPSTC)
 - Background power (+3.3 V) on/off signal (BACTA)

Caution:

If the AC power cable is still connected after the power is shut off, +3.3 V background voltage is supplied to the main board via CN800 and power on/off circuit.

- The filter/rectification circuit reduces noise on the AC line and generates DC voltage for the regulator.
- The regulator generates the various DC voltage levels shown in the table below for the switching regulator. The regulator detects the voltage output level at the +5 V line and feeds the information back to the switching circuit to maintain a stable output level regardless of load variations. Not every output voltage level is subject to adjustment.

Table 2-2 Output Specifications

Power Source	+5 V	+3.3 V	+12 V	+12 FV	+22 V
Output voltage accuracy (%)	±5	±5	±5	12.0-13.8 V	19.0-24.0 V
Ripple (mV p-p)	200	100	100	400	400
Ripple/Spike (mV p-p)	200	100	100	400	400
Output current Min (A)	1.0	0.3	0.2	0.05	0.0
Rated (A)	2.4	2.0	1.0	1.5	0.3
Peak(A)	-	-	-	2.0	-
Overvoltage protection	+7 V	+4.6 V	-	+16 V	+30 V
Overcurrent protection	Transient (Note)	Distortion	Distortion	Transient (Note)	Transient (Note)
Use	Logic circuit	Logic circuit	Analog circuit	Fan/Audio circuit	Light valves

NOTE : Protection is the transient detection type, it is recoverable with power on.

- The intake fan removes the heat generated in the power supply unit. Heat expelled by the intake fan is blown by the exhaust fan, connected to CN860 on the main board.

Pin assignments on CN800 (main board)

Table 2-3 CN800

Pin. No	Signal
1	+22 V
2	+12 V
3	A GND
4-7	L GND
8	PWDS
9	BACTA
10	LPSTC
11	+12 FV
12,13	+3.3 V
14,15	+5 V

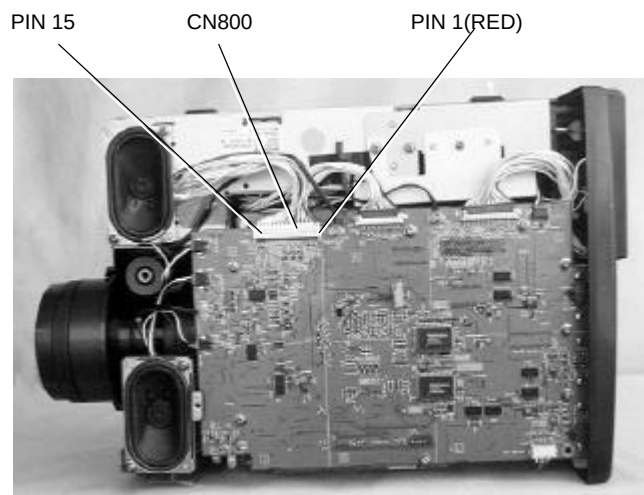


Figure 2-7

2.3 MAIN BOARD

The main board consists of the CPU, P-ROM, video memory (SRAM), digital video controller, and circuits to control the control panel, computer input interface, monitor output, speakers, power management, etc. The main board controls everything except video signal generation. The main board is available as a unit for service. The fuses listed below are soldered onto the main board and are for reference only.

Table 2-4 Main Board Fuses

Fuse	Specifications	Purpose
FB300	BLM41A8005 (A)	+12 V Monitor circuit
FB316	BLM41A8005 (A)	+12 V Video input A/D circuit
FB317	BLM41A8005 (A)	+12 V Computer IN 1/2 circuit
FB318	BLM41A8005 (A)	+12 V ADC for Computer IN 1/2
FB802	BLM21B201S (A)	LPST
FB806	BLM41A8005 (A)	BACTA
FB807	BLM41A8005 (A)	PWDS
FB808	BLM41A8005 (A)	STFIL
FB809	BLM41A8005 (A)	LSTAT
FB810	BLM41A8005 (A)	LV thermistor
FB811	BLM41A8005 (A)	Lamp thermistor
FB812	BLM41A8005 (A)	PBS thermistor

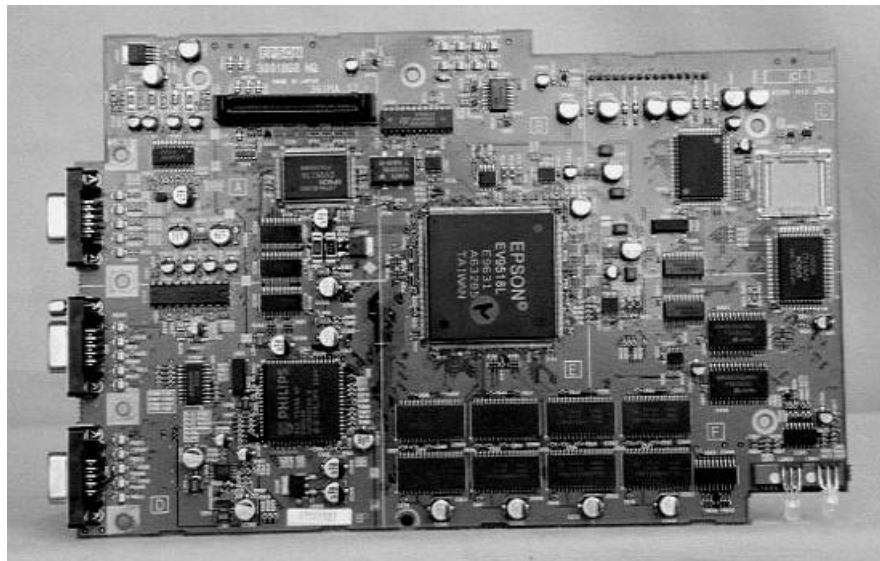


Figure 2-8

Main Board Circuit Block

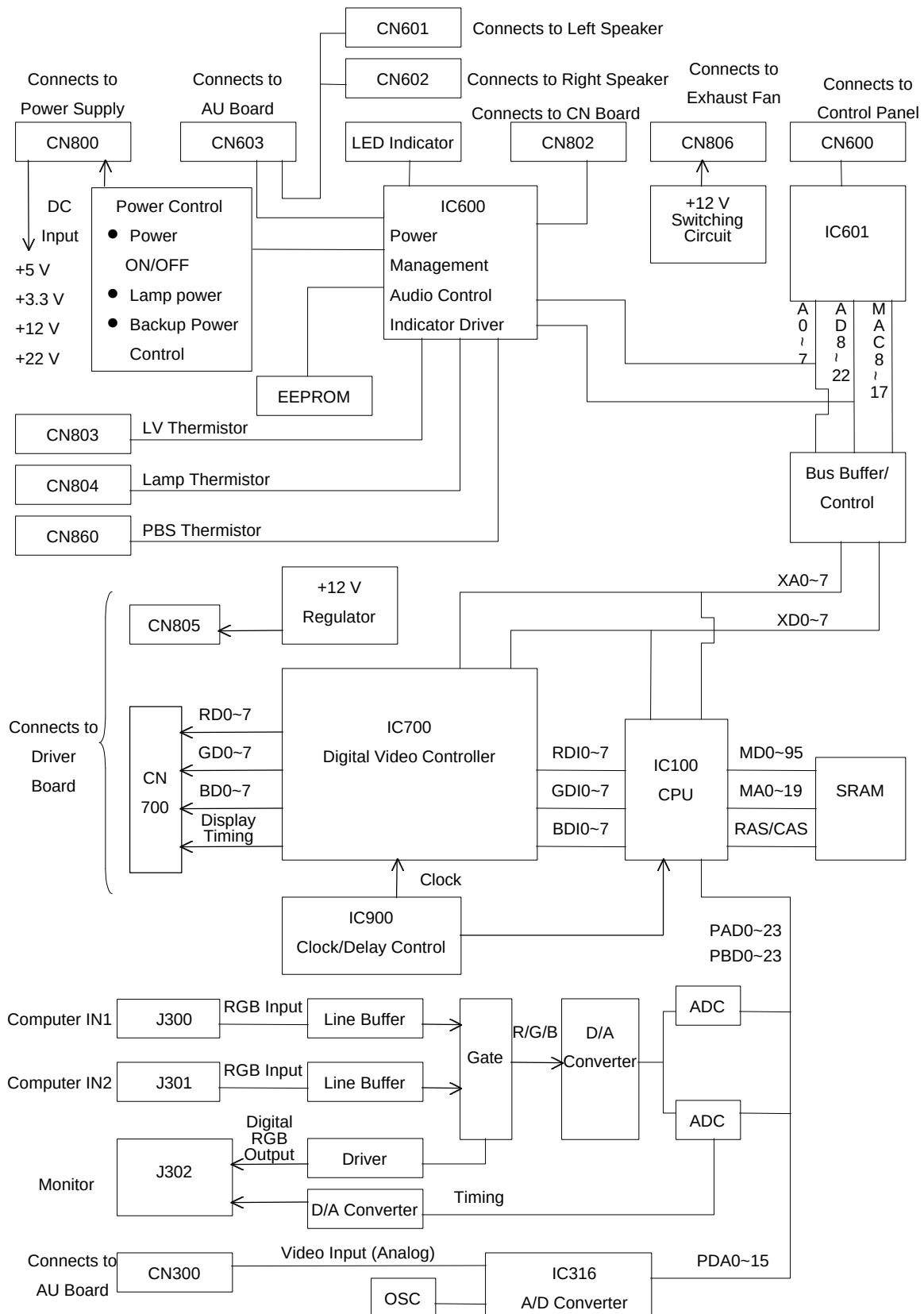


Figure 2-9
2-10

Functional Outline

- IC600 and related circuits are backed up with +3.3 V which is provided from the power supply. (If the AC cable is connected to the AC source, power supply provides the +3.3 V for back-up bias even if RS-361 is turned off.)
- When the power is turned on, IC600 on the main board generates the reset signal and initializes the circuit. The CPU reads the program from flash ROM and writes it into SRAM. Then the CPU sets the functions based on the program and projects the initial image.
- Three thermistors (LV Thermistor / Lamp Thermistor / PBS Thermistor) detect temperature. If the temperature exceeds a predefined level, the thermistors send an interrupt signal to IC600 and shut off the power supply.
- Computer analog or digital input signals are converted into analog signals first, then converted to digital signals again by ADC. These display data written into the video memory (SRAM).
- Analog output signals are transmitted in different ways for analog input and digital input.
 1. Digital RGB:
The digital image signals are output via the gate and driver board.
 2. Analog RGB
The analog image signals are converted by the ADC and the D/A converter.
- The data is stored in the SRAM, then output for display to the video controller via the CPU.
- Video input signals are transferred via the AU board and converted into digital signals with the A/D converter. They are stored in the SRAM.
- The projector has a timer circuit that controls the operating time of the light source bulb (lamp inner housing). Its operation is described below.

Table 2-5

Light source state	Lamp monitor state
When the operating time of the light source bulb (lamp inner housing) exceeds 1900 hours.	The lamp monitor continues to flash red and orange for 5 minutes after it is turned on. (The light source stays on.)
When operating time of the light source bulb (lamp inner housing) exceeds 2000 hours.	The lamp monitor flashes green and orange. (The light source goes off.)
When the light source bulb (lamp inner housing) runs out before its expected end of life.	The lamp monitor flashes red.

If you observe the conditions above, replace the light source bulb (lamp inner housing). Then turn on the switch. The fuse in the lamp will melt and short out, so that the lamp timer will be reset automatically.

2.4 DRIVER BOARD

The driver board has two functions: one is converting the R/G/B display signal from the main board into six states of analog signals (light valve driver signals) and the other is controlling the display image by referencing electrical correction data.

The entire optical engine must be replaced in maintenance service. No individual parts, such as the driver board, may be replaced. The fuses listed below are soldered onto the Driver board. They are not replaceable and are listed for reference only. Please refer to Section 3.1 for details.

Table 2-6 Driver Board Fuses

Fuse	Specification	Purpose
F250	4511.25 (A)	+3.3 V
F251	4511.25 (A)	+12 V
F252	CCP2E10 (A)	+5 V

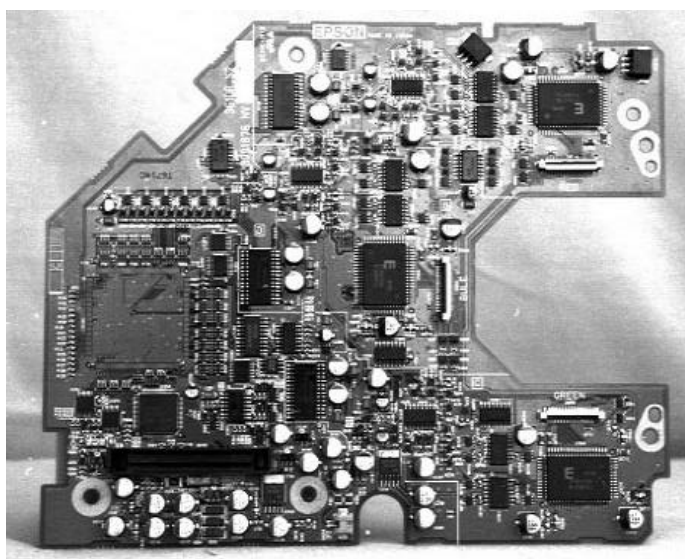


Figure 2-10

Functional Outline

- The signals RD 0~7, GD 0~7, and BD 0~7 output from the main board are first converted into analog signals by the digital to analog converter before being output to

the driver circuit for the light valves.

- Timing signals output from the display controller are converted into signals for the light valves (LCDs) by the D/A converter and LCCOM circuit before they are output.
- The filter/gate circuit is designed to reduce noise influence on the display driver circuit. To reduce impulse noise, input signals are sent through the three-level filter circuit. To reduce the effects of timing delays on the logic, gate circuits work as trigger circuits for each signal line (R/G/B) and unify the output timing.
- The flash ROM contains electrical correction data for the image display. The display controller reads the correction data. The controller uses the correction data for display timing generation, brightness / contrast / chroma and density control.
- Light valve driver circuits convert the input analog signals to the LCD (Liquid Crystal Display) driver signals.

Circuit Block Diagram of the Driver Board

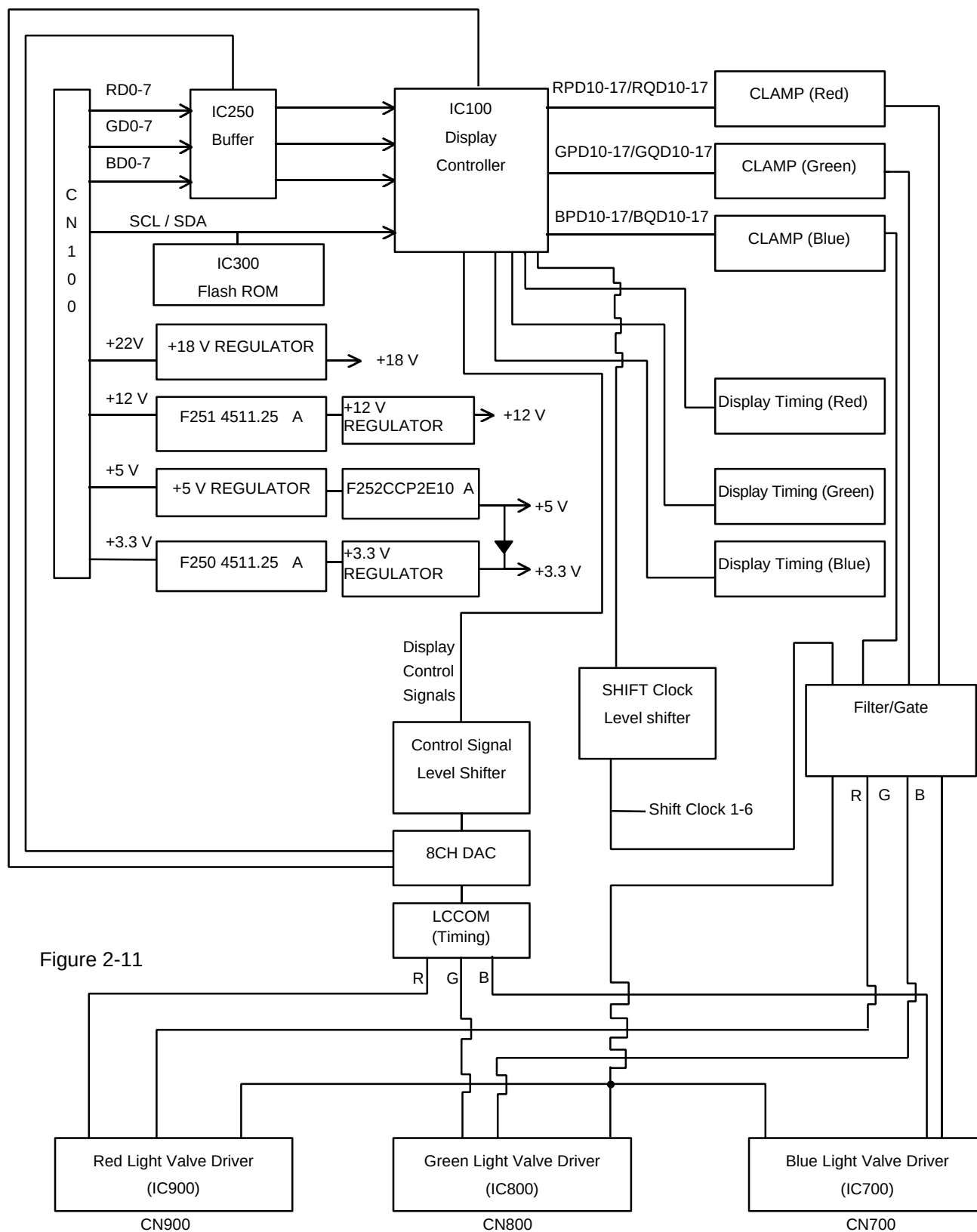


Figure 2-11

2.5 CONTROL PANEL

This panel includes a board with 13 switches, and is connected to CN600 on the main board.

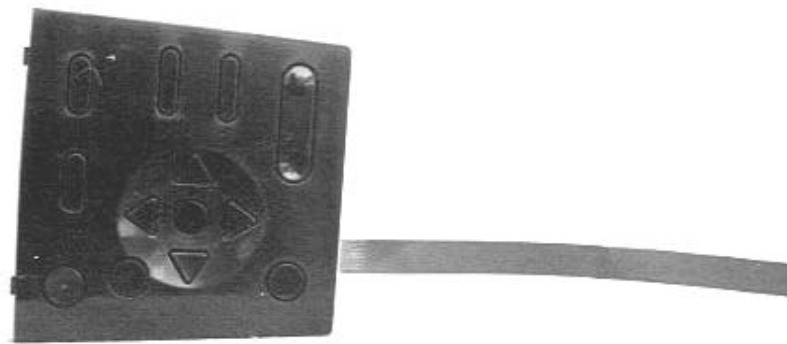


Figure 2-12

2.6 AU BOARD

The AU board includes an audio control circuit and interface connectors that receive audio signals from a host computer or external video or other device. The interface connectors are shown below.

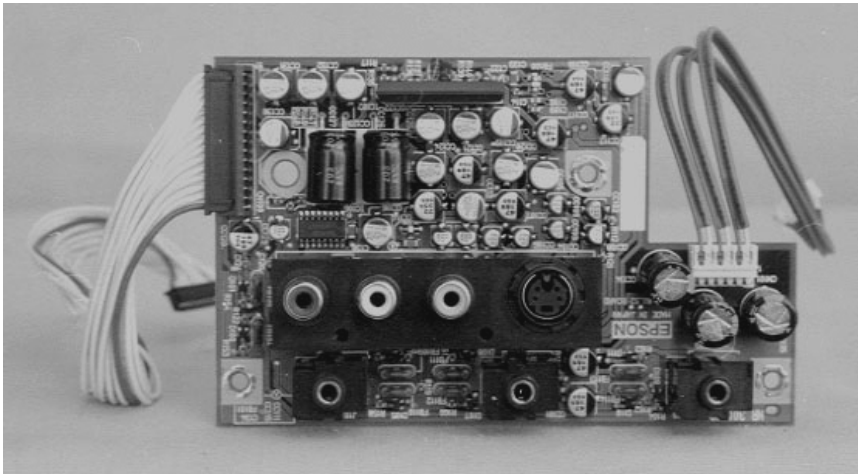


Figure 2-13

AU Board Circuit Block

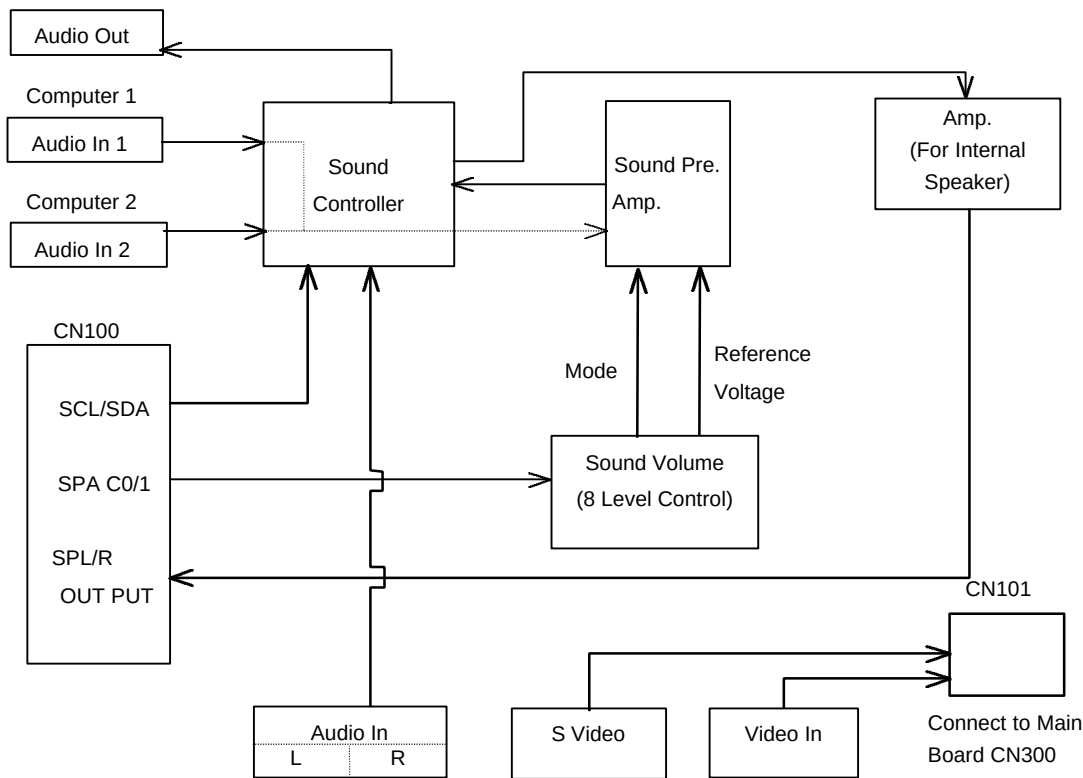


Figure 2-14

The only circuits that the interface signal lines for S-Video and Video In have are noise filter circuits, therefore they output signals to the main board through the connector CN101.

Audio input signals from computer 1/2 (via Audio In 1/2) or from a video device (via Audio In L/R) are input to the sound controller and amplified by the sound preamplifier. Then they are output to the “Audio Out” interface or the built-in speaker through the sound controller again.

The sound controller performs the audio-signal output selection based on the SCL/SDA (serial clock /data) signals provided from the main board. The sound volume control uses 8 levels (mute ~ max.) based on the signals (SPAC 0/1) from the main board.

2.7 FR BOARD

The FR board is used for connecting the remote control receiver and a mouse or serial interface of a host computer. The control has an 8-bit CPU and mouse / serial switching circuit installed on the board.

CN100 (Mouse / COM1) and CN102 (Mouse / COM2) are multi-mouse connectors. If the ELP communication kit is installed on the host computer and cables are connected to it, you can control the computer with the remote control. The controller on the FR board automatically determines the circuit operation mode (Mouse or Com) to apply the proper circuit.

The optional remote control receiver can be connected to the remote control interface (J100). The receiver provides the same functions as the standard receptor board (FI / RI). Without the receiver, the remote control can be used within a limited area in the front and rear. The receiver expands the range for the remote control.

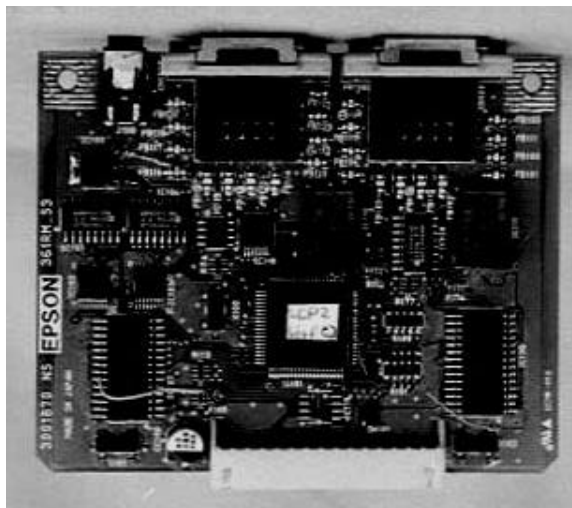


Figure 2-15

The signals from the receptor board (FI/RI board) and the optional remote control receiver are accepted by the remote (IC101), the infrared signals received from the remote control are output under OR conditions to the main board through CN101 and the connector board.

If a host computer with the ELP communication kit 2 option is connected to the interface, the relay circuit is switched depending on each operation. This enables the switch data transmission to the host computer and remote mouse operation by the remote control.

The ELP communication kit 2 option also enables the remote control to draw lines and patterns on the screen.

The relay circuit (IC111 or IC116C) is switched to be able to accept the mouse encoder signal and the button signal. Then the signals based on “Tracking +/- button” operation are output to a host computer through the remote. The signals are transferred through the host computer’s interface, and you can control (remote mouse controlling) the host computer without its mouse.

FR Board Circuit Block

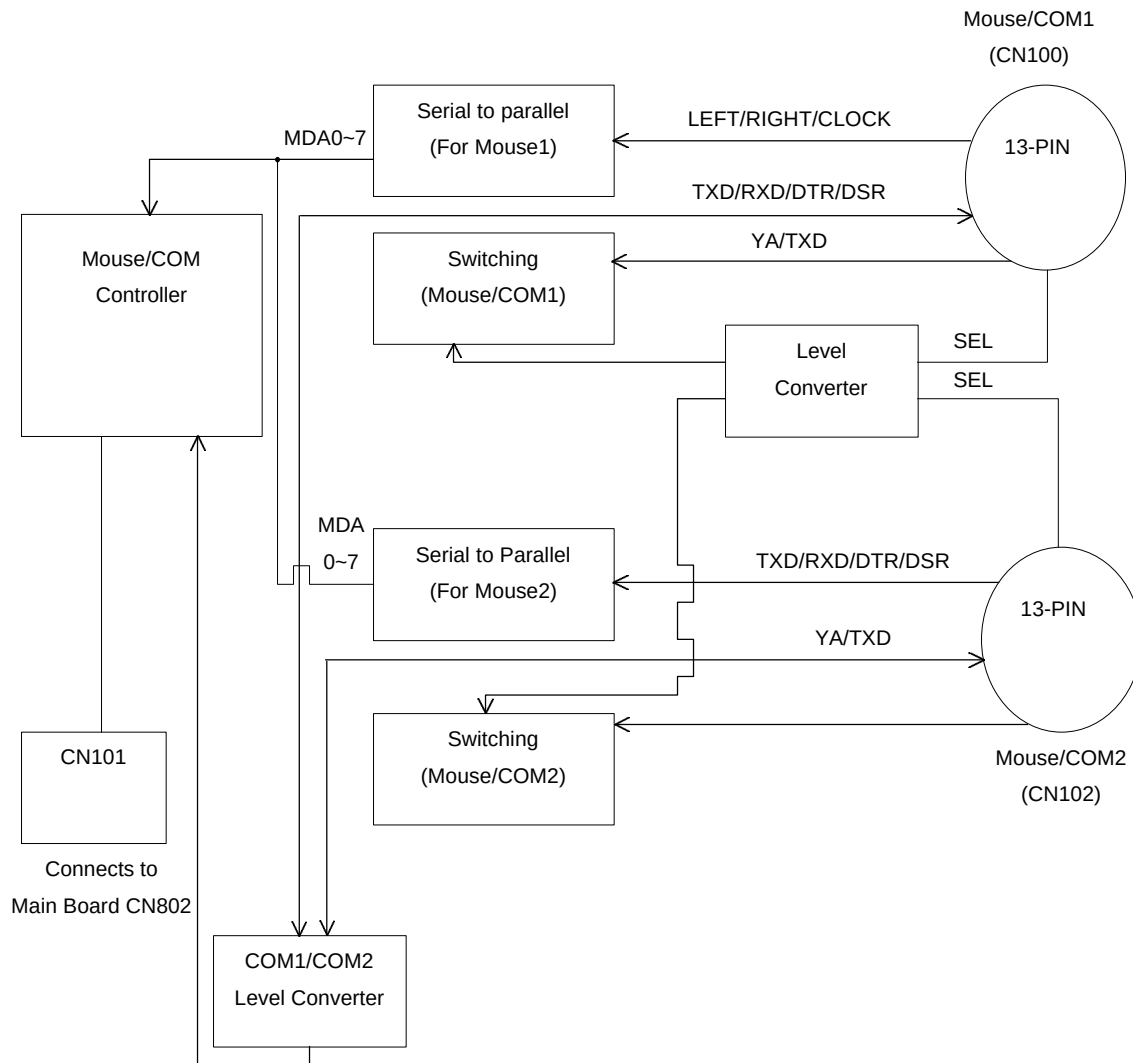


Figure 2-16

2.8 CN BOARD

The CN board is the relay board for the cable connector. It has five connectors. The signals below are transferred to the main board through this board.

- *FI board signal: Remote control signals go from the front receptor to the FR board.
- *RI board signal: Remote control signals go from the rear receptor to the FR board.
- *FC board signal: Filter cover detection switch signals go to the main board.
- *FR board signal: Mouse / COM interface 1/2 signals go to the main board.

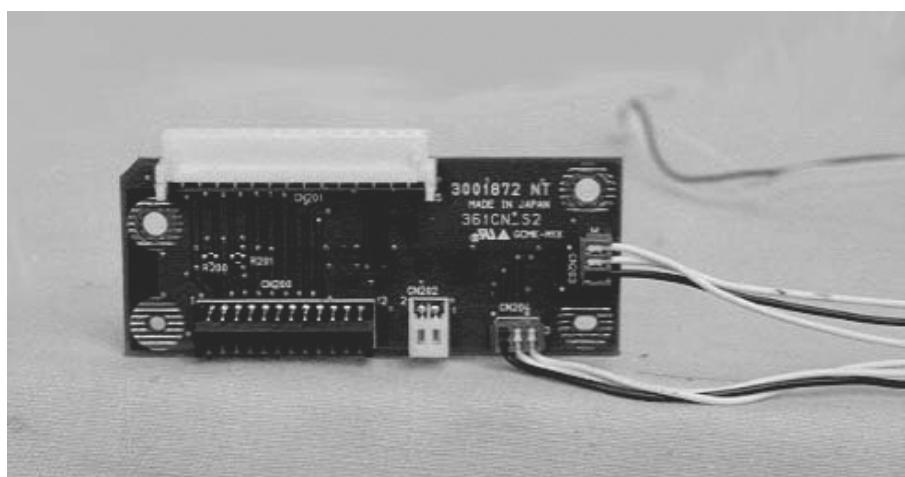


Figure 2-17

CN Board Connecting Block

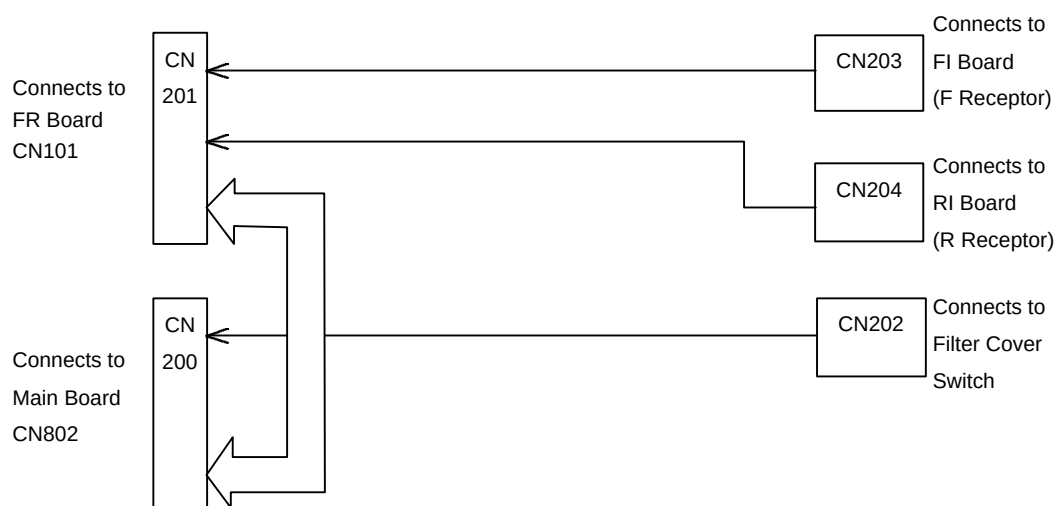


Figure 2-18

The signals from the receptor board (FI board/RI board) are sent to the FR board and are used for wireless mouse control (controlling the host computer via the remote control). The signals from the filter cover switch are sent to the main board. If the filter cover is open, power cannot be supplied. The signals for controlling serial operations and the receptor board signals are sent from the FR board to the CN board.

2.9 RECEPTOR BOARD (FI/RI BOARD)

This board detects infrared signals. This unit consists of two receptor boards: one is attached to the speaker bracket on the front face (FI board), and the other is on the rear case (RI board). You can control this device on both sides. The FI and the RI are different in shape, but the same in function (circuit).

Receptor Boards and Their Circuits

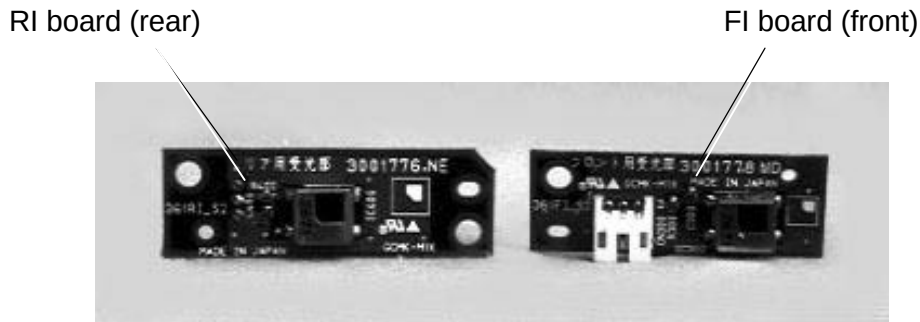


Figure 2-19

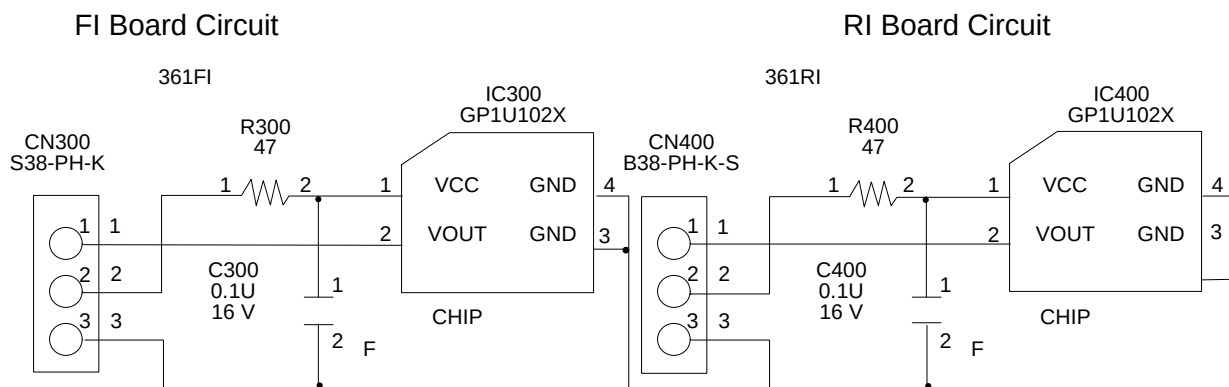


Figure 2-20

Each receptor board is connected to CN203/204 on the connector board. Each board's output signal (serial data) is connected to CN802 on the main board via CN200 after wired OR is applied.

1. The main board operates the power and the start-up menus, using serial data received from the remote control (button switches and pointers).
2. The serial signal sent to the driver board via the main board controls the display (Freeze/Blank).
3. The serial signal sent to the AU board via the main board controls mute and audio volume.

Remote Control Circuit Block

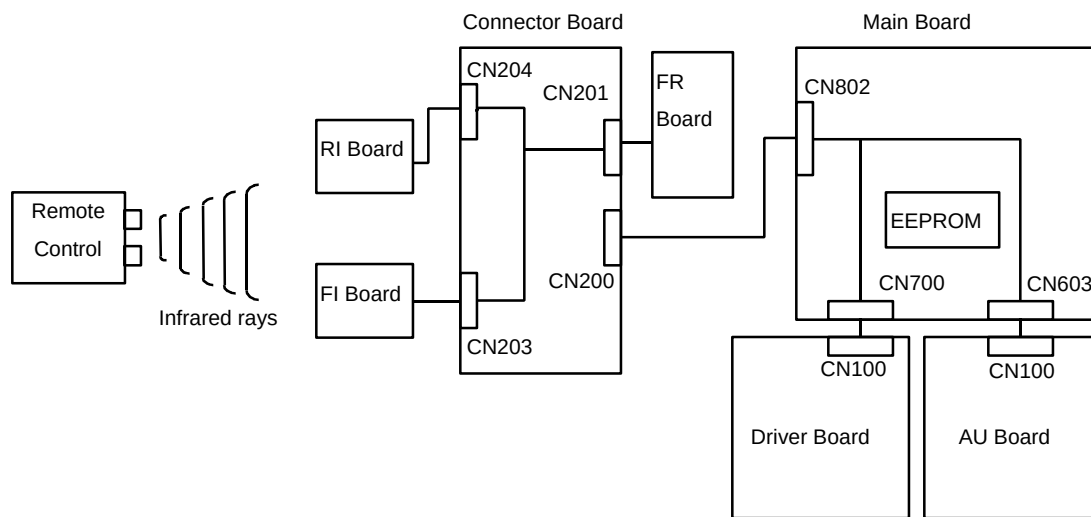


Figure 2-21

2.10 SPEAKER UNIT

Inside the upper case are two, upward-facing speakers. Audio signals from the computer or AV devices are output through these speakers. If an external speaker is connected to the Audio Out terminal, the built-in speakers are disabled.

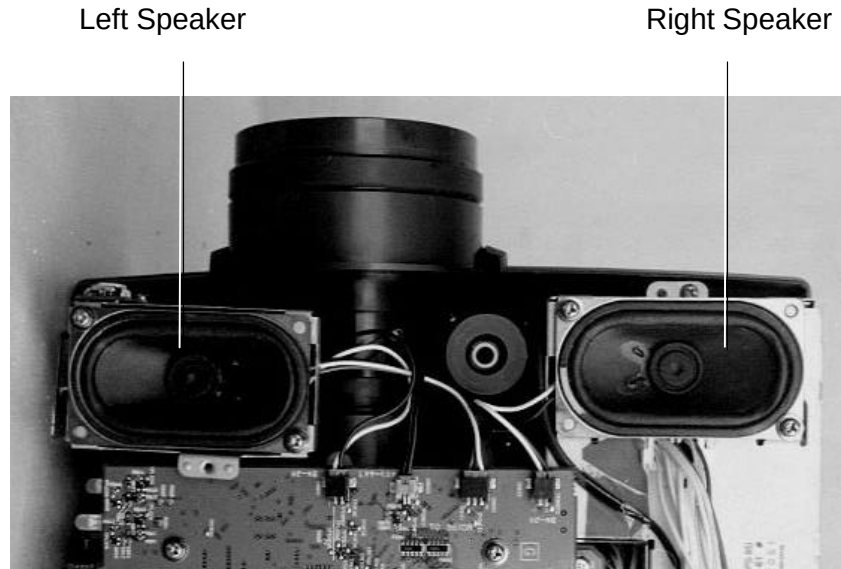


Figure 2-22

Speaker Control Circuit Block

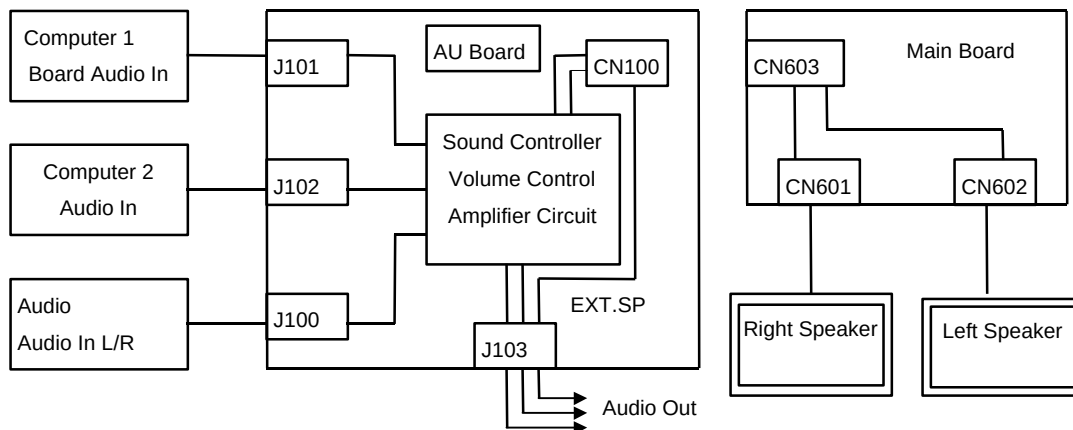


Figure 2-23

The audio input signals from computers or an audio device are first amplified by the control circuit on the AU board, then output to the speakers via the main board. The speakers are connected to CN601/602 on the main board. The main board detects the

presence of an external speaker and uses the built-in speakers if there is no external speaker.

2.11 LIGHT GUIDE BLOCK

The light valve block eliminates ultraviolet rays, which are harmful to the light valves, and makes the light intensity from the light source lamp uniform before dividing it into 3 light outputs (R/G/B). Lenses and mirrors built into the block disperse the light. The illustrations below show the outside of the light valve block and an internal diagram.

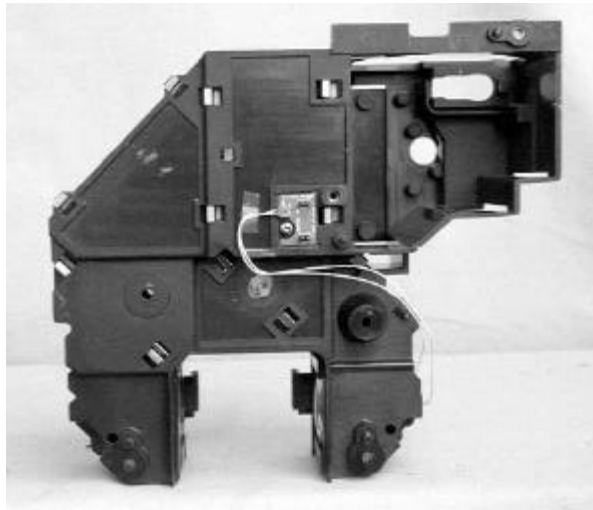


Figure 2-24

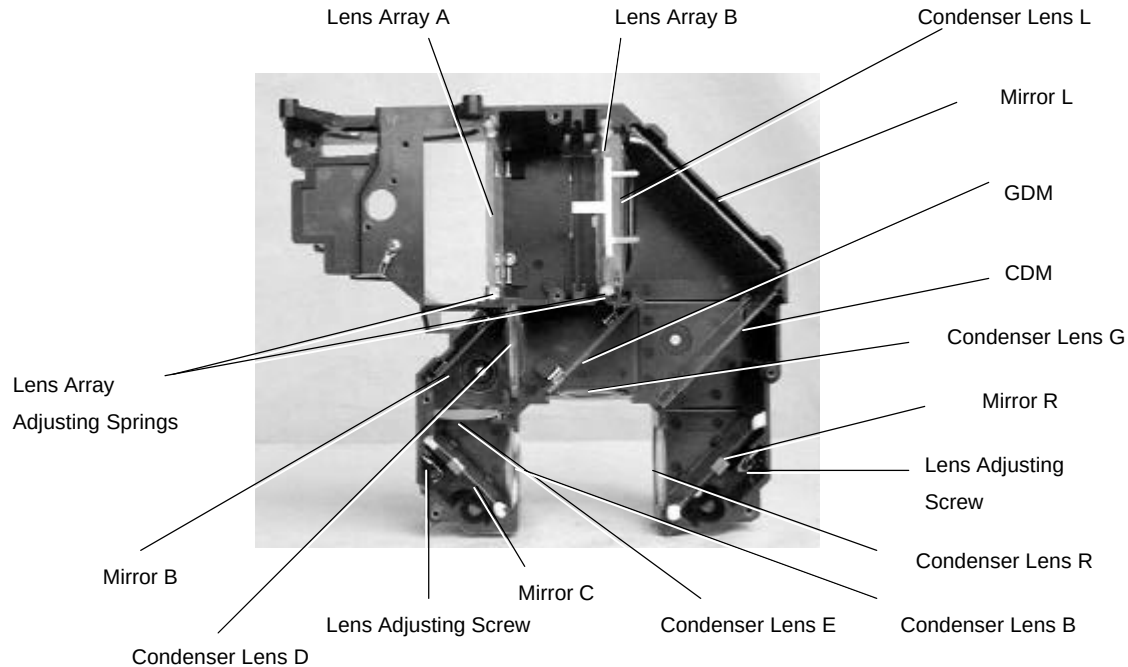


Figure 2-25

- Lens Arrays A and B**
 After dispersion of the light from the light source lamp by lens arrays A and B, the brightness is roughly uniform. A UV filter coats the surface of the multi-lens array to eliminate ultraviolet rays. The light dispersed through the lens arrays A and B is further dispersed through the PBS to make the light intensity uniform.
- CDM**
 The CDM is a light filter that looks red in visual light. The CDM (A) filter transmits only red light and reflects blue and green light from the light source.
- GDM**
 The GDM is a light filter that looks blue in visual light. The GDM filter transmits only blue light from the light source. Since the input light to the GDM is only blue and green light from the CDM as described above, green light is reflected by the GDM and provided to condenser lens G.
- Condenser Lens L**
 Condenser lens L collects the light dispersed by the lens arrays A and B to prevent reduction and provide light to mirror L in the next stage.

- Condenser Lens R/G/B
Collects the lights dispersed into the polarization plate on the optical head.
- Mirror R/C Unit and Lens Adjusting Screw
Reflects light to condenser lens E/B.
The reflection angle can be adjusted with the lens adjusting screw.
- Mirror B
Reflects the light to condenser lens E.
- Lens Array Adjusting Screw
Used for adjusting the A/B lens array position to obtain the best uniformity of source light.

2.12 LAMP INNER HOUSING

The lamp inner housing consists of the DC drive light source lamp (150 W-350 V), the power supply connector and the fuse board (FU board). The lamp mounted on the base of the lower case is a user-replaceable item (Type: ELPLP03). The average brightness of the lamp is 400 lm (ANSI). When the lamp is new, its brightness is approx. 450 lm (maximum). After running about 2000 hours, the lamp's brightness is reduced to almost half that of a new one.

The fuse board (FU board) determines whether the lamp inner housing is installed, and controls the lamp life (2000 hours). The power supply connector receives 350 VDC current from the power supply unit, so its lead wire is connected to the lamp.

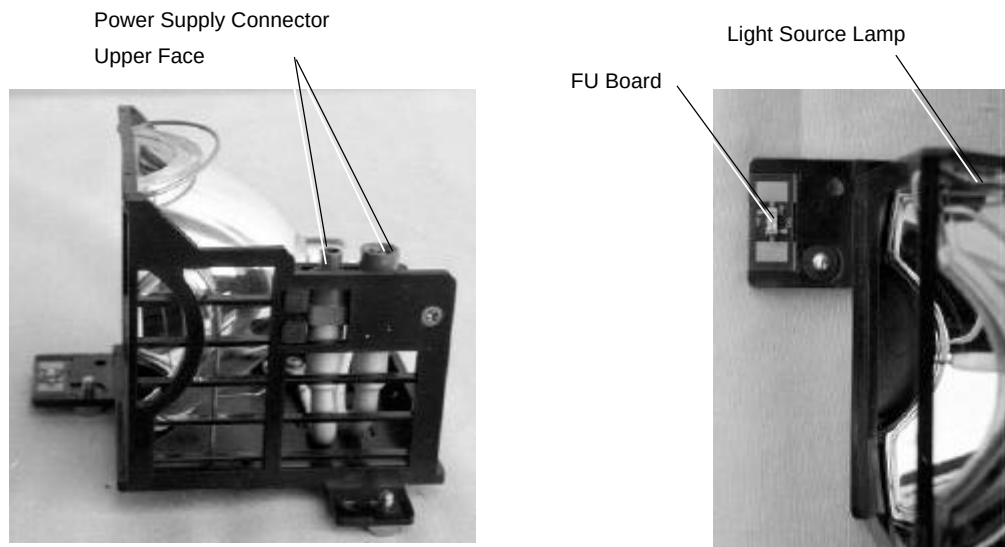


Figure 2-26

Light source lamp

The standard lamp life is 2000 hours. If you notice reduced lamp brightness, replace the lamp inner housing even if you have used the projector for less than 2000 hours.

The total running time of the light source lamp is written in the EEPROM (IC603: ST24W04FM6TR) on the main board. If the lamp is nearing or has reached the end of its life, IC600 (M37732S4BFP) outputs signals to control the following:

When the total running time has reached 1900 hours (1900~2000), the orange and red lamp indicators blink alternately. The controller (IC600) on the main board counts the total running hours and writes the data in IC603. The lamp runs only 100 hours after the orange and the red lamp indicators start to blink alternately, so you should replace the lamp as soon as possible. (If the lamp indicators blink alternately when you turn the projector on, the lamp life is no more than 100 hours. Therefore, the lamp life may be suddenly terminated.)

When the total running time has reached 2000 hours, the fuse in the lamp inner housing is blown by the LFUSE signal from IC600 and the lamp is turned off, then the cooling down operation starts (the orange lamp indicator blinks). Afterward, the lamp will not run until you replace it with a new one.

Control Circuit Diagram

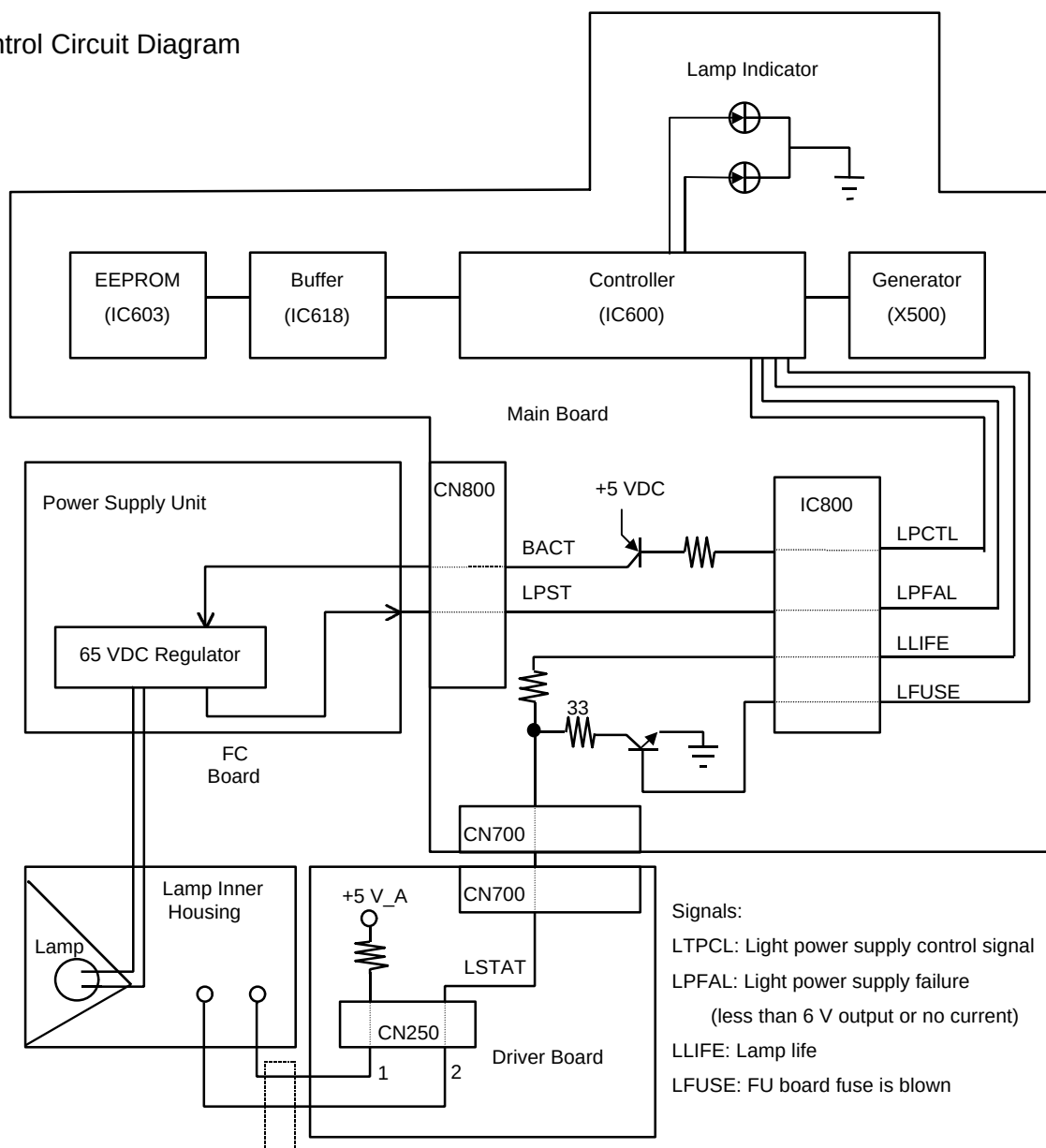


Figure 2-27

Fuse board (FU board)

This board has a 62 mA rated fuse. The terminal sections placed on the both ends of this board touch the FC board installed on the base of the light guide unit. The cable of the FC board is connected to connector CN250 on the driver board, so the signal from the FC board is sent to the main board via the connector CN100. When the total running time reaches 2000 hours, IC600 on the main board outputs an LFUSE signal, so the

fuse on this board is connected to the ground through a resistance (88 Ω). Consequently, the fuse is blown and the LLIFE signal is switched from HIGH to LOW. When LLIFE becomes LOW, IC600 switches LPCTL to HIGH and shuts down the lamp power (65 VDC) from the power supply unit. When the power is shut off, and LPST (LPFAL) becomes HIGH, IC600 detects power off in the lamp and starts the cooling down sequence.

2.13 SENSORS/SWITCHES

The following devices listed in the table are installed in the projector for safe operation and prevention of malfunctions.

Table 2-7 Sensors/switches

Name	Location/Type	Function/Use
Filter cover switch	Micro switch on the lower case	Turns power off when the filter cover is open. (Power on is disabled.)
Interlock switch	Push-switch on the power supply unit	Turns power off when the lamp cover is open. (Power on is disabled.)
Safety switch	Thermal switch on the lamp outer housing	Overheating protection for the lamp area. Power is shut off if the temperature exceeds a specified limit.
Lamp thermistor	Thermistor on the lamp outer housing	Overheating protection for the lamp area. Power is shut off if the temperature exceeds a specified limit.
LV thermistor	Thermistor on the prism duct	Overheating protection for the light bulb. Power is shut off when the temperature exceeds a specified limit.
PBS thermistor	Thermistor on the side of the power supply unit	Overheating protection for the power supply unit. Power is shut off when the temperature exceeds a specified limit.

2.13.1 Filter Cover Switch

This switch is installed in the lower case and locks with the tab of the filter cover. With the filter cover open, the intake fan absorbs external air to cool down the light valve. This allows dust get on the light valve and the prism, degrading the displayed image. The switch is installed so you cannot turn on the projector when the filter cover is open.

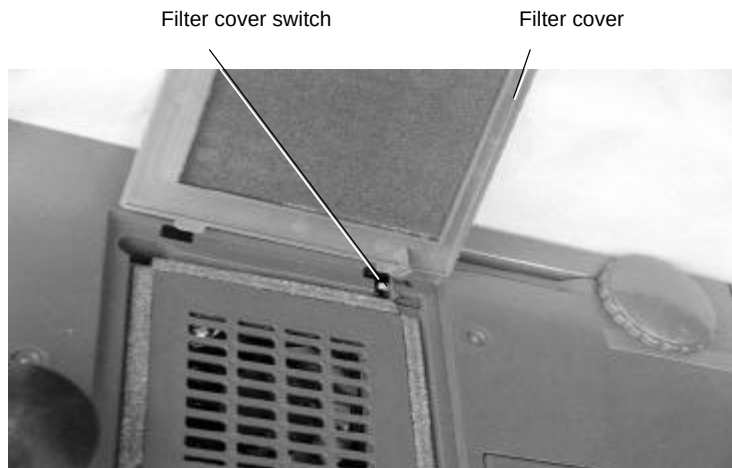


Figure 2-28

The filter cover switch signal is connected to CN802 on the main board via CN202 on the CN board. In main board circuit, IC100 generates the interrupt signal and outputs the power shut off signal to CN800, so all regulating operations of the power supply unit are stopped.

2.13.2 Interlock Switch

This switch is installed on the side of the power supply unit and locks with a tab on the lamp cover. If you turned on the projector with the lamp cover open, the light source lamp (lamp inner housing) would run and generate high heat. To protect you from burns, the interlock switch is installed on the AC power source line and the projector cannot be turned on while the lamp cover is open.

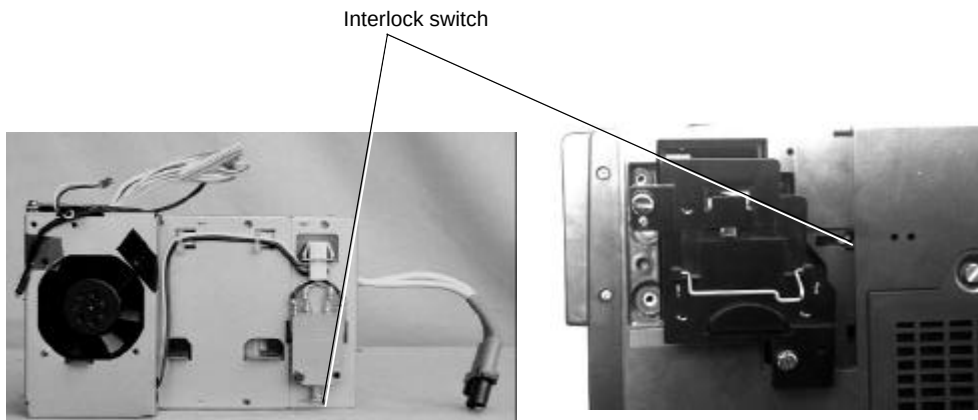


Figure 2-29

2.13.3 Safety Switch

This is the thermal switch for overheating protection installed on the lamp inner housing. If an overheating condition is caused by contamination of the exhaust fan, the lamp thermistor (described in 2.13.4) temporarily shuts off the supply of AC power to protect it from overheating. The safety switch is installed to recognize overheating trouble in the lamp thermistor.

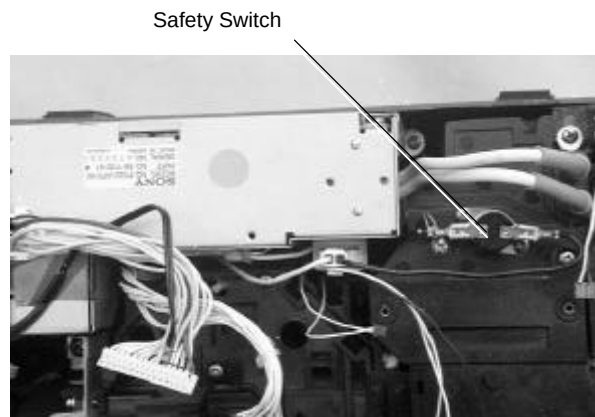


Figure 2-30

The power supply unit cable is connected with a fastening tab to the safety switch. When the temperature rises to a certain temperature, all regulating operations of the power supply unit are stopped and power is shut off. Once this switch runs, you cannot start the power until the temperature falls to a certain temperature. In this case, you must also consider the lamp thermistor or the main board may be defective.

2.13.4 Lamp Thermistor

This is the temperature detection thermistor installed on the lamp outer housing (near the safety switch). To protect the light source lamp from overheating, this thermistor shuts off the power on the power supply unit if the temperature rises to a certain temperature (lower than the safety switch's level).

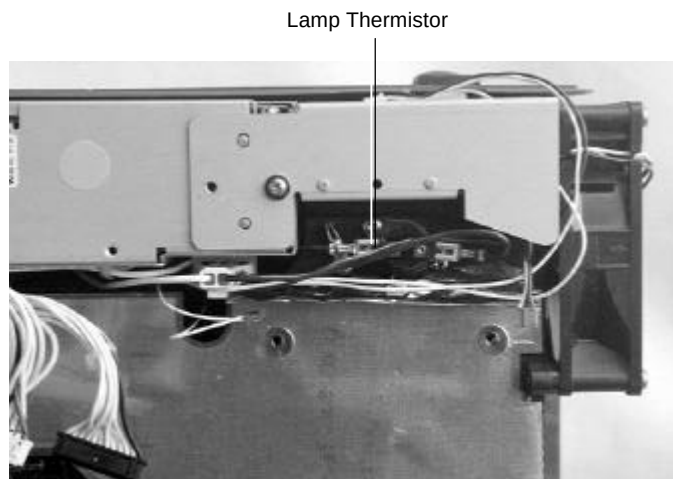
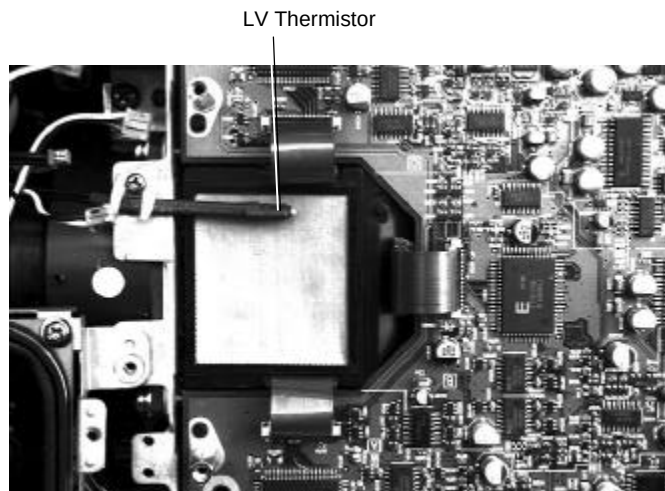


Figure 2-31

The lamp thermistor is connected to CN804 on the main board. If there is overheating, IC600 generates an interrupt signal and shuts off power on the power supply unit via CN800.

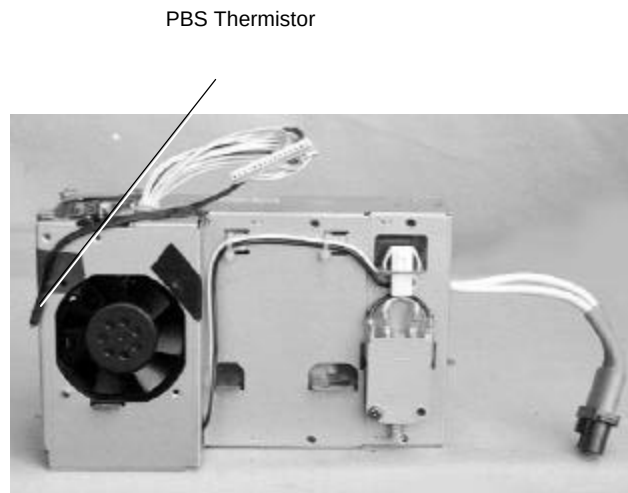
2.13.5 LV Thermistor

This is the temperature detection thermistor installed on top of the light valve. If cooling is not sufficient because of intake fan failure (installed at the bottom of the light valve) or filter contamination (installed at the top of the light valve), the power is shut off to protect the light valves from overheating. The light valve (liquid crystal panel) has poor thermal stability. The power shut off control is the same as the lamp thermistor's, described in section 2.13.4.

**Figure 2-32**

2.13.6 PBS Thermistor

This is the temperature detection thermistor installed on the side of the fan (attached to the power supply unit). If the environment around the power supply unit overheats because of a fan or circuit abnormality, this thermistor shuts off the power. The power shut off control is the same as the lamp thermistor's described in section 2.13.4.

**Figure 2-33**

2.14 BOARD CONNECTIONS

Parts Side

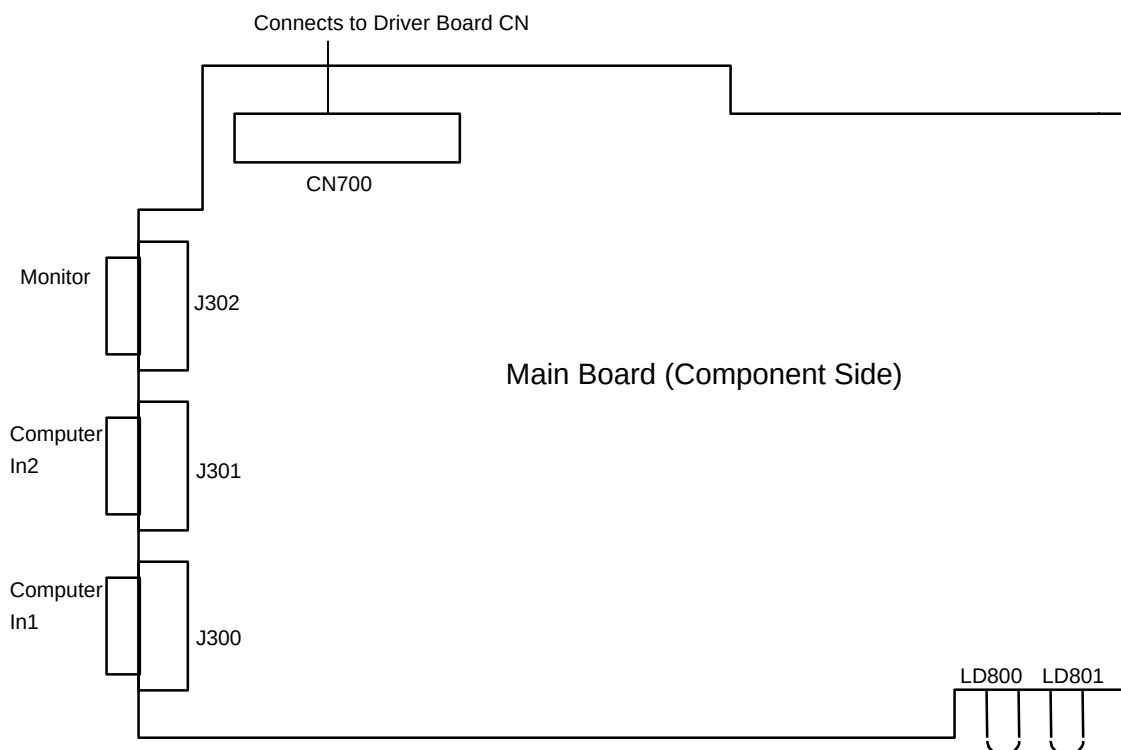


Figure 2-34

Solder Side

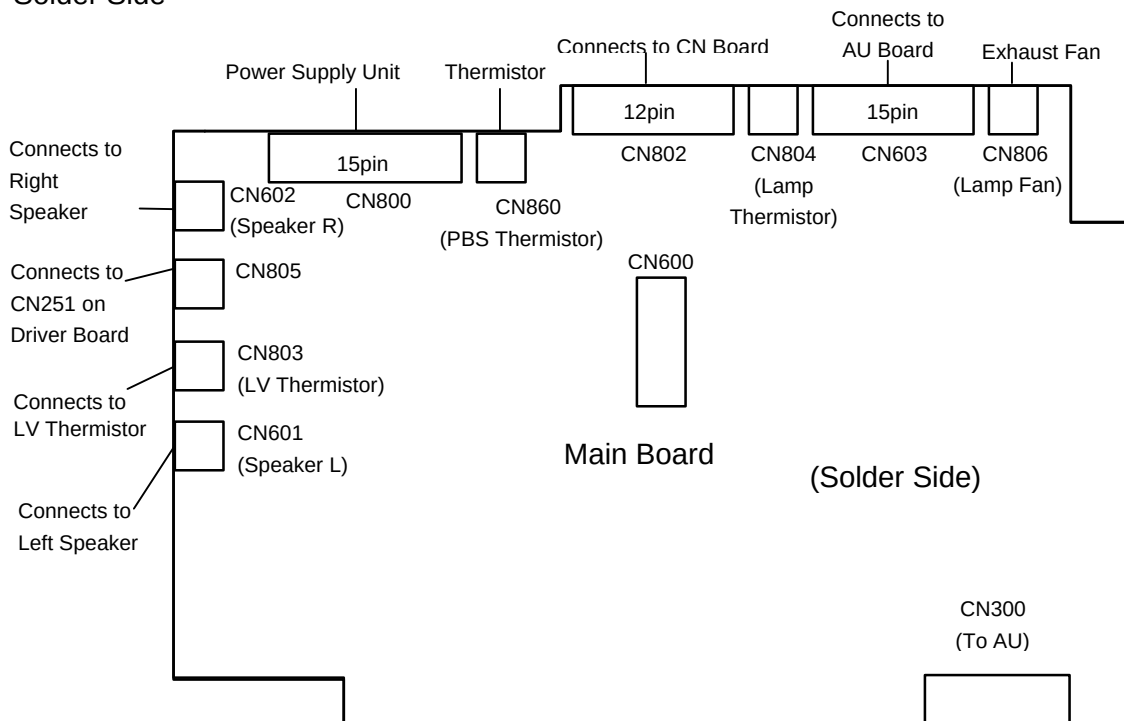


Figure 2-35
2-34

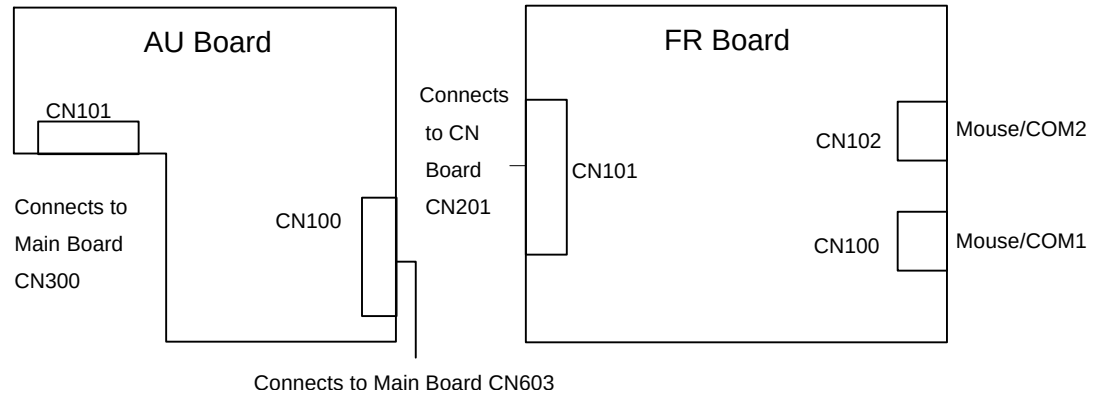


Figure 2-37

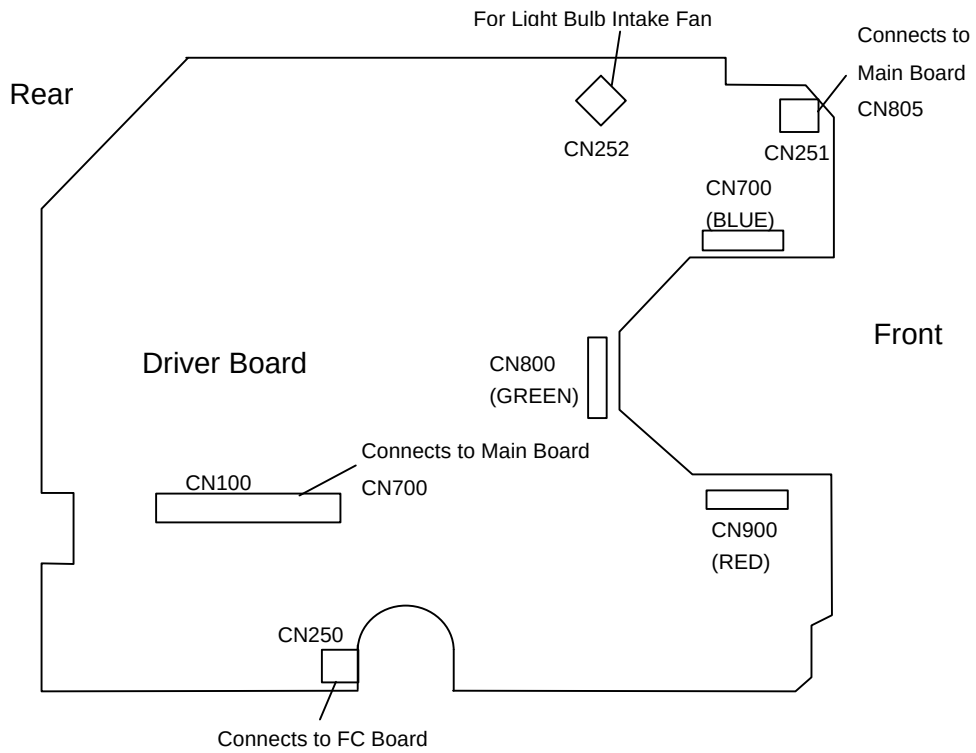


Figure 2-38

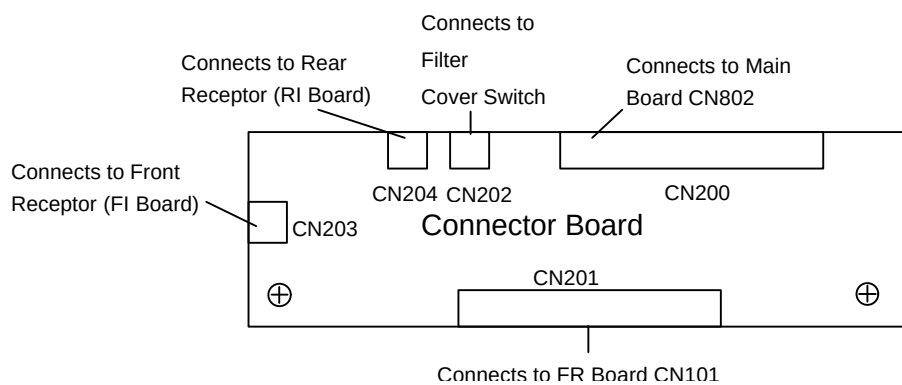


Figure 2-40

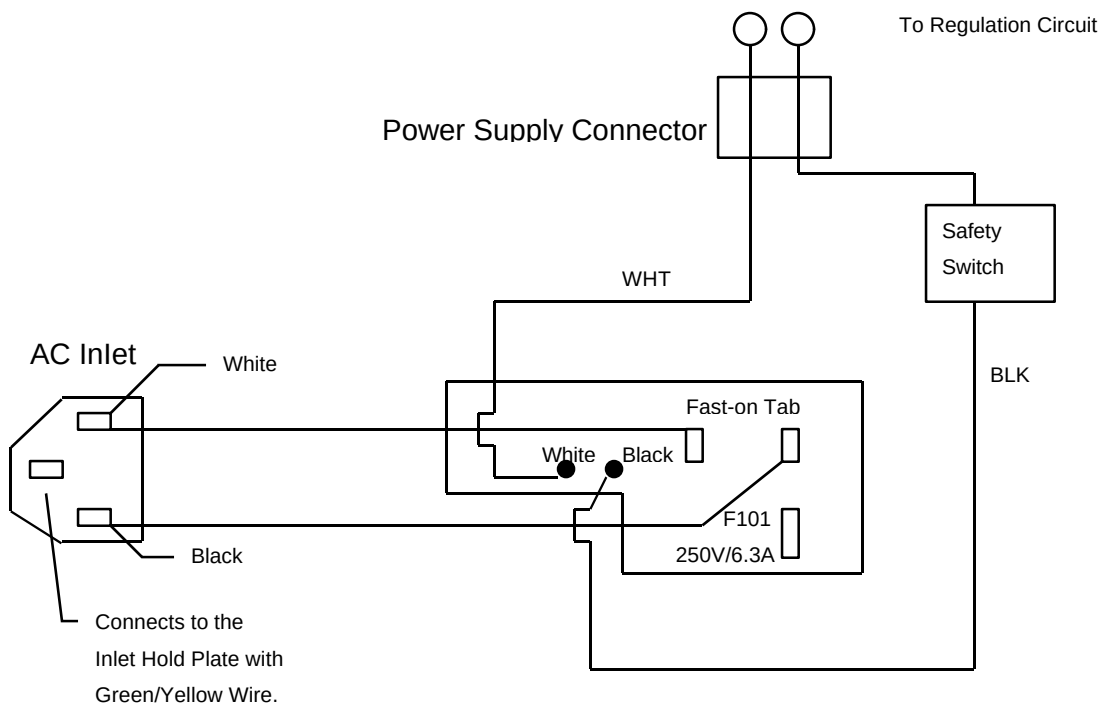


Figure 2-41

3.1 Disassembly and Assembly Procedures

This section explains how to disassemble the projector. The reassembly procedure is the exact reverse of the disassembly procedure.

3.1.1 Preparatory Procedures

- 1) Remove any ring, wrist watch, cuff buttons, or other metal accessories that are likely to come into contact with the equipment.
- 2) Wear gloves.
- 3) Wear a wrist band and ground it. Place a ground mat under the unit.
- 4) Turn off the main unit and the host computer.
- 5) Unplug the power cord from the main unit and service outlet. (Even if the power is off, back-up bias is regulated and supplied to the circuit board when the power cord is connected to the service outlet.)
- 6) Disconnect the interface cable from the main unit.
- 7) Clean the air filter, interface, and case cover with a vacuum cleaner.

3.1.2 Required Tools and Accessories

Prepare the tools and accessories listed in the table below.

Table 3-1 Required tools

Name	Quantity	Supply	Use
Phillips screwdriver 2	1	Commercial	Dissassembly of the case and interiors
Flathead screwdriver	1	Commercial	Removal of lamp cover and air filter cover
Tweezers	1	Commercial	To unlock the FPC connector on the DR board
Brush	1	Commercial	To brush off the dust around fan
Vacuum cleaner	1	Commercial	To clean the fan and filter
Paper wiper	Some	Commercial	To clean the projector lens
Air blower	1	Commercial	To clean the fan and filter
Gloves	1	Commercial	To avoid cuts
Wrist band, Ground mat	1	Commercial	To avoid electrostatic effects

3.1.3 Limitations of Disassembly (Optical Engine Handling)

The disassembly of the mechanical section is detailed in section 3.2. The optical engine is one replaceable part.

These units are specified as the optical engine. (Treat as one replaceable part in field maintenance.)

- ① Optical head unit
- ② Prism unit
- ③ Light guide unit
- ④ Projector lens unit
- ⑤ Driver board

Note: Do not disassemble the optical engine or replace any unit in the optical engine.

3.1.4 Mechanical Adjustments

Optical Head Unit

The polarization plates (R/G/B) are factory-aligned. Do not apply any mechanical stress to the polarization plate, and do not loosen the screws. If the alignment is modified, color divergence will occur, and the color images will not be clear.

Prism Unit

To synthesize the light output from each polarization plate (including R/G/B light valves), the prism unit (concurrent with the polarization plate) is aligned in the factory. If the alignment is modified, pixel divergence in R/G/B synthesizing and in the projector lens unit causes out-of-focus images and non-uniform color.

Caution: Do not loosen the prism unit mounting screws.

Light Guide Unit

The components of the light guide unit are factory-aligned. If the alignment is modified, clear images cannot be produced, because the brightness or chroma is not uniform on the screen.

The lens array and mirrors are aligned in the factory to support the best display performance of the light guide unit. If the alignment is modified or the location is changed, the display screen may be distorted.

Caution: Do not disassemble the light guide unit. If you remove the upper guide cover from the unit, the alignment of lenses or mirrors may be changed or dust may stick to the unit. Since the projector requires precise adjustment, it cannot be adjusted in the field.

Projector Lens Unit

The projector lens unit is aligned (position and mounting torque) in the factory. If the alignment is modified, pixel divergence will occur, creating unclear images.

Electrical Corrections: Driver Board

Some parts in the mechanical section of the optical system require adjustments as mentioned above. In the control circuit (driver board), the output driver for the display signal is slightly different from the output driver of other devices. The mechanical section of the optical system (e.g., light valves) must be electrically corrected. To obtain the best images, mechanical adjustments and electric corrections must be made. For this reason, some correction values are written to flash ROM on the driver board before shipping. Because this factory correction is necessary to match the optical system with the electrical system, the driver board and the optical block (consisting of the optical head/light guide unit) make one set.

At factory shipment, the following correction data is stored in the flash ROM on the driver board for the specified optical engine.

- Gamma adjustment data
- Flicker adjustment data
- Ghost contrast adjustment data
- Sub contrast adjustment data

A special device and skilled engineer are necessary for writing correction values, therefore the data cannot be adjusted in the field.

3.1.5 Cautions For Field Maintenance

Observe the following procedures when you repair the projector. Otherwise, display quality is not guaranteed, and EPSON repair service will no longer be available.

- **Do not disassemble the optical block or loosen any screws.**
- **If either the optical block or the driver board needs replacement, replace them as a set. Also, when you send them back for repair, send them back as a set (optical engine).**
- **Because the optical block and driver board make one set, you should never change its combination (that is, use only the new driver board with the older parts).**

3.1.6 Precautions

These precautions are for the individual assembly and disassembly procedures. Read them carefully before starting an assembly or disassembly procedure. A set of general precautions is given below.

As you disassemble the main unit, dust that has collected on the internal fans and air filters is likely to migrate and contaminate light valves R, G, and B (the heart of the display mechanism), deteriorating the display quality. To prevent this from occurring, check for dust inside of the main unit and, if necessary, clean it with a vacuum cleaner before reassembling. Light valves R, G, and B and circuit board assemblies are highly sensitive to static electricity. When you remove an optical engine or circuit board, place it in an anti-static bag immediately.

When you perform the assembly or disassembly operations listed below, check the unit and its surfaces for any dirt before reinstalling them. If the unit is dirty, clean it.

1. Removing the optical engine.
2. Removing the lamp inner housing.
3. Removing the air filter frame.

The speaker unit incorporates a permanent magnet. Keep it away from electromagnetic media such as floppy disks and magnetic cards.

Handle the optical engine (projector lens and light guide unit) with care. They are highly susceptible to vibration and shock.

Do not try to disassemble any part (e.g., power supply unit) that is not covered in this manual.

3.2 Disassembling and Assembling the Projector Main Unit

The flowchart for disassembling the projector main unit is shown below. You can reassemble dismantled projector parts by reversing the order of disassembly. Therefore unless specified, this manual contains no assembly procedures. Detailed descriptions of disassembly procedures are given in sections 3.2.1 to 3.2.26.

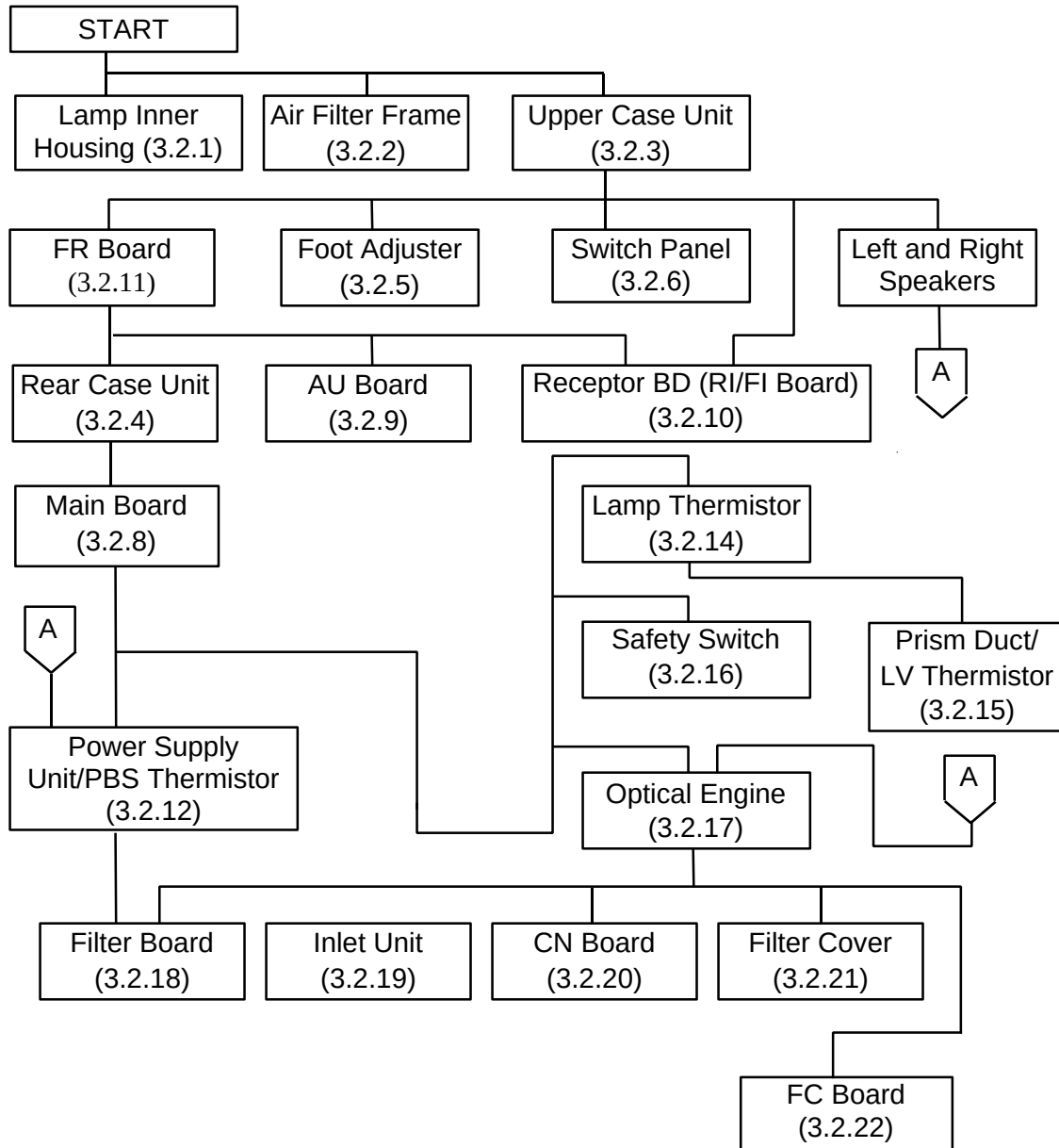


Figure 3-1

Removing the Lamp Inner Housing

WARNING:

The lamp unit is very hot immediately after use and may burn you if handled carelessly. Before removing the lamp unit, make sure the lamp inner housing unit has cooled down. When installing the lamp unit, take care not to touch the lamp's reflector with your hands (to prevent the reflector from being contaminated).

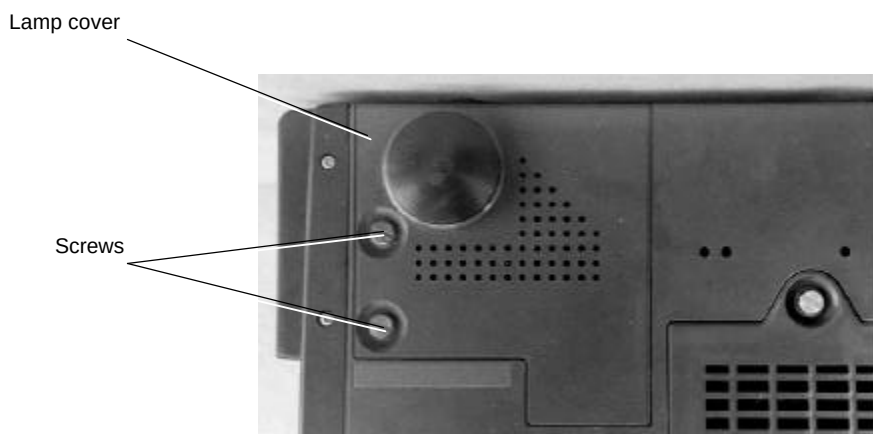


Figure 3-2

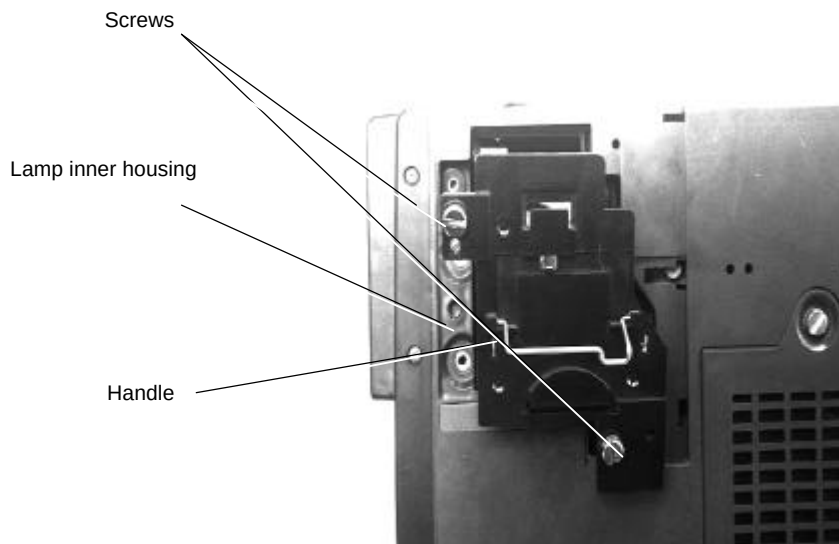


Figure 3-3

1. Remove the lamp cover mounting screws from the bottom of the lower case.
Screw: -M4*7.5 F/Ni: P/N1021771
(mounting torque: 4.5 kg. cm = 3.9 lb. inch)
2. Remove the two mounting screws from the lamp inner housing.
Screw: -M4*7.5 F/Ni: P/N1021771
(mounting torque: 4.5 kg. cm = 3.9 lb. inch)
3. Pull up the handle on the lamp inner housing and remove the lamp unit.

3.2.2 Removing the Air Filter Frame Unit

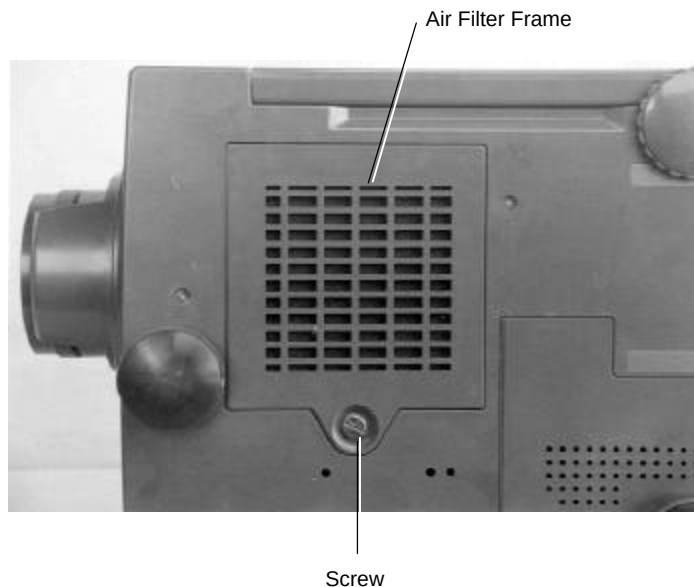


Figure 3-4

Remove the Air Filter Frame mounting screw from the bottom of the lower case. Then lift it up.

Screw: -M4*7.5 F/Ni: P/N1021771
(mounting torque: 4.5 kg. cm = 3.9 lb. inch)

3.2.3 Removing the Upper Case Unit and Handle

Prerequisite conditions: None.

Handle Holder Cover

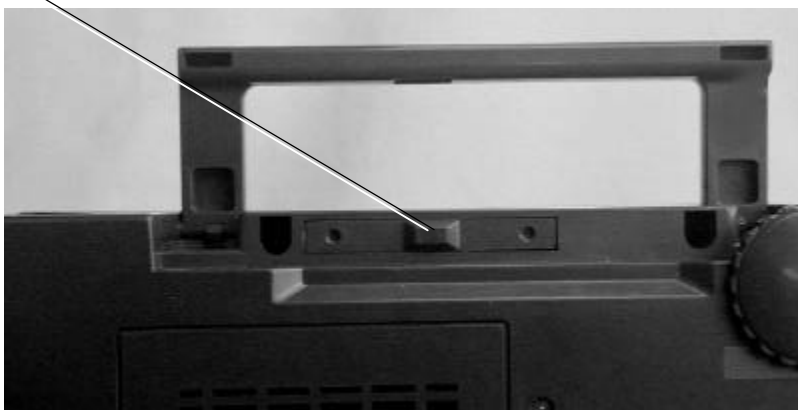


Figure 3-5

Screws

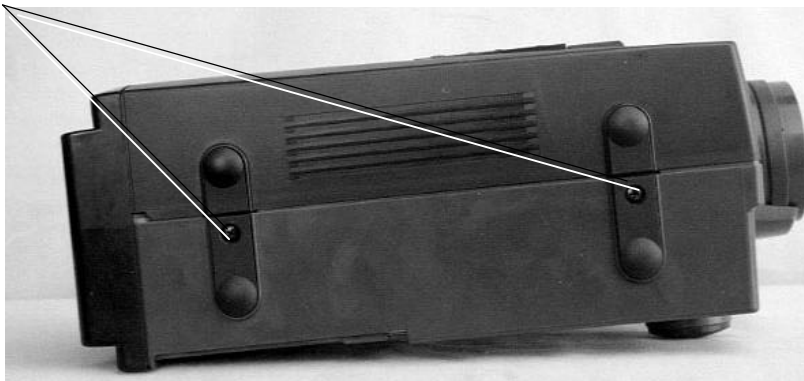


Figure 3-6

1. Pull the handle up.
2. Remove 2 screws under the handle.
Screw: +M4×10 F/ZB Bind: P/N1033707
(mounting torque: 6.0 kg. cm = 5.2 lb. inch)
3. Remove 2 upper case unit mounting screws on the right.
Screws: +M4×6 F/ZB: P/N1034318
(mounting torque: 6.0 kg. cm = 5.2 lb. inch)

(Continued from the previous page)

4. Hold the left and right sides of the upper case and lightly pull it partially up.

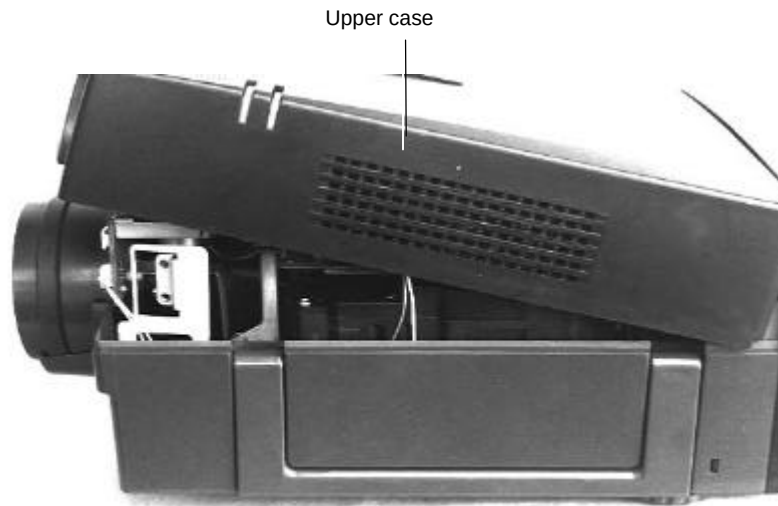


Figure 3-7

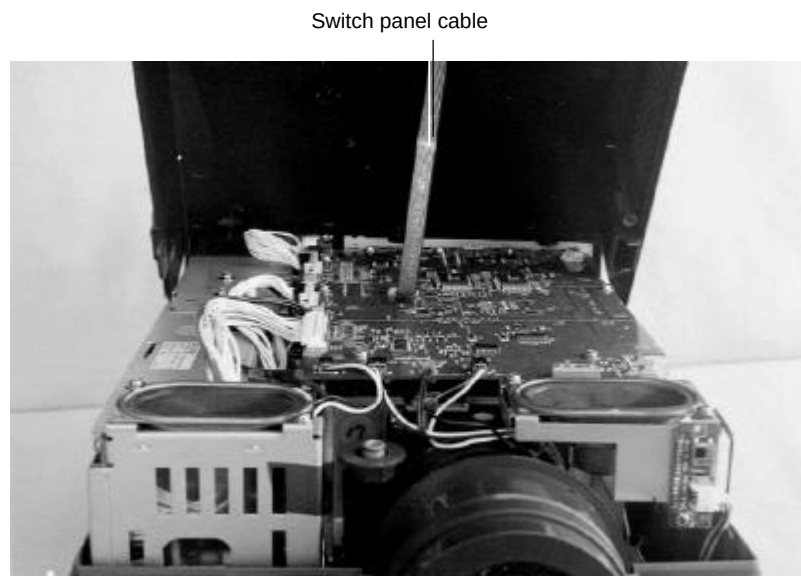


Figure 3-8

5. Disconnect the control panel cable from CN600 on the main board.

6. Remove the upper case.

7. Remove the handle from the lower case unit.

3.2.4 Removing the Rear Case Unit Assembly

Prerequisite condition: 3.2.3

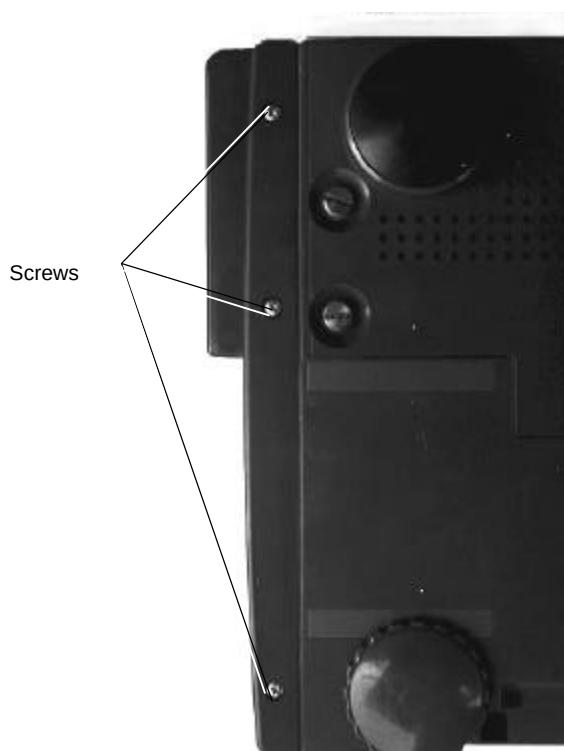


Figure 3-9

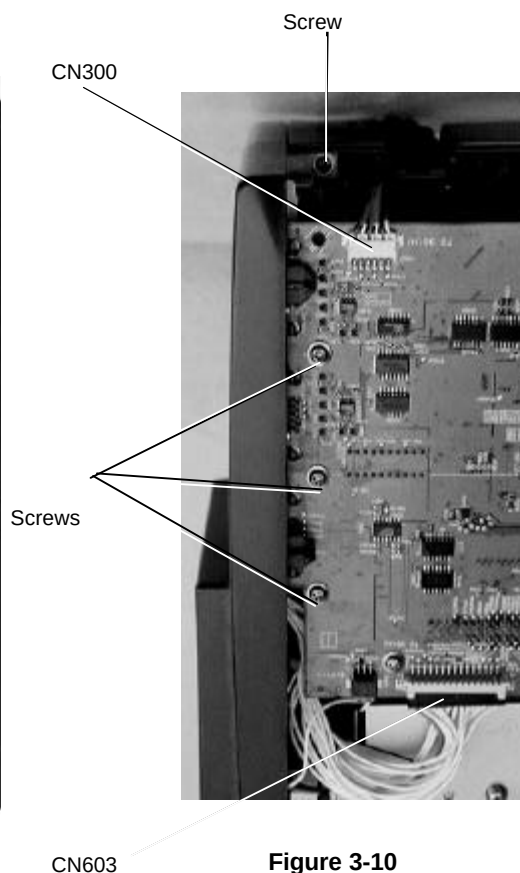


Figure 3-10

1. Remove 3 screws mounting the rear case to the bottom of the lower case.
Screws: +M3×8 F/ZB: P/N 1033691
(mounting torque: 6.0 kg. cm = 5.2 lb. inch)
2. Remove 3 screws mounting the main board to the audio board shield plate, and the screw on the AC inlet hold plate.
3. Disconnect connectors CN300/CN603 on the main board.
4. Remove the cable from the RI board connector (the RI board connector is mounted on the rear case unit.)
5. Remove the 6 hex nuts from the Computer In and Computer In2 monitor ports.
6. Grasp both sides of the rear case unit, then gently pull it out a short distance.
7. Remove the screw holding the blue wire to the AU board.
8. Remove the rear case.

Caution:

When installing the case unit assembly, push it slowly.

3.2.5 Removing the A/B Foot Adjuster

Prerequisite condition: 3.2.3

Foot Adjuster A

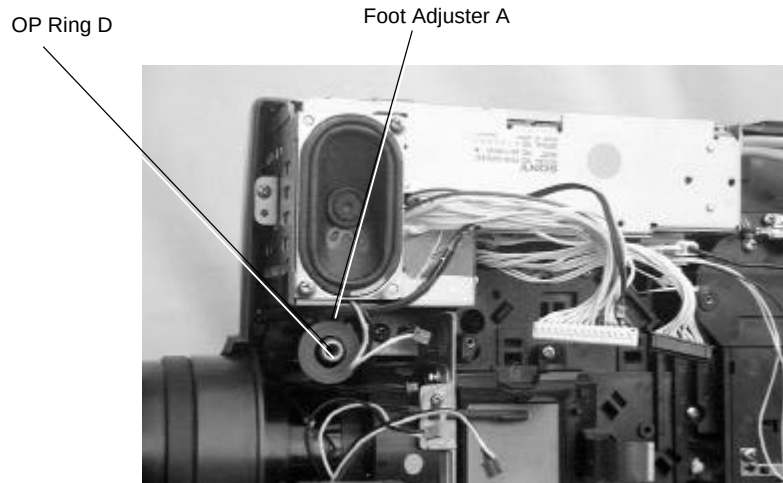


Figure 3-11

1. Push down the foot pipe and hold it; then fully lift up foot adjuster A.
2. Remove the OP ring D from the top of foot adjuster A.
3. Push down the foot pipe and remove it.

Foot Adjuster B

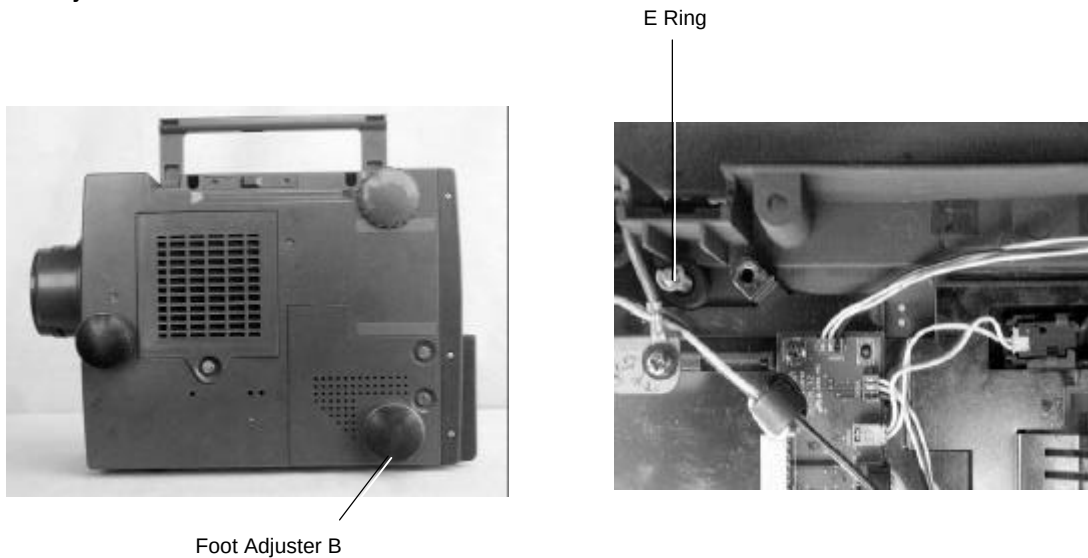


Figure 3-12

1. Turn foot adjuster B completely clockwise to shorten it.
2. Remove the E ring from foot adjuster B.
3. Turn foot adjuster B completely counterclockwise to remove it.

3.2.6 Removing the Control Panel

Prerequisite condition: 3.2.3

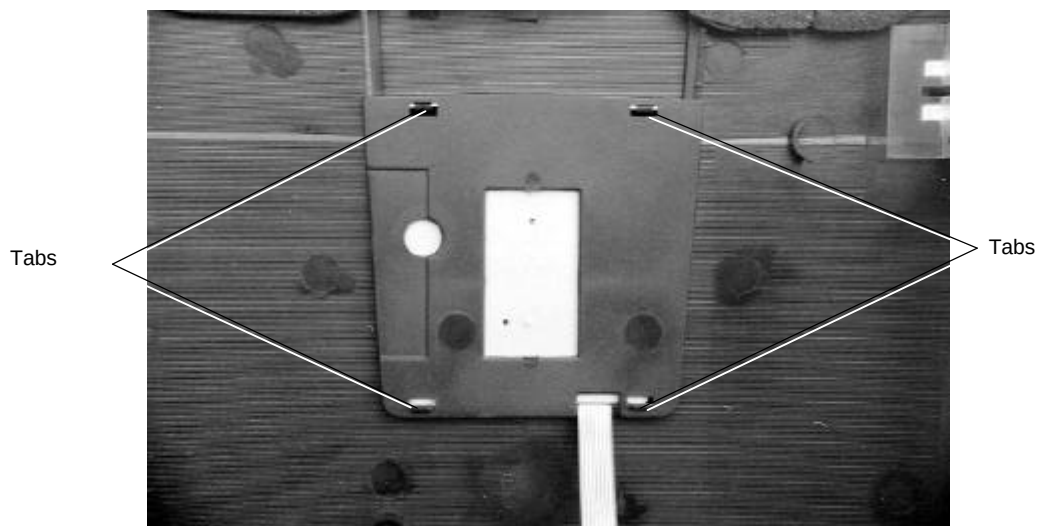


Figure 3-13

1. Pull down the 4 tabs from inside. Then remove the control panel from the upper case.

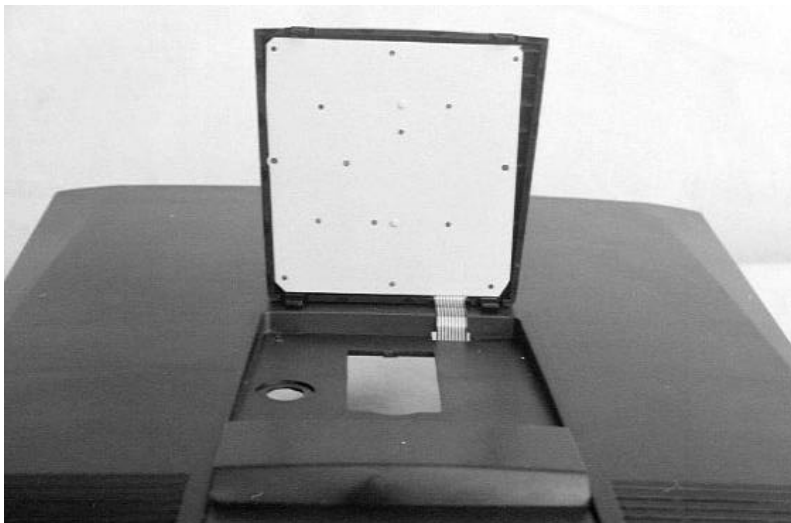


Figure 3-14

3.2.7 Removing the Right and Left Speakers

Prerequisite condition: 3.2.3

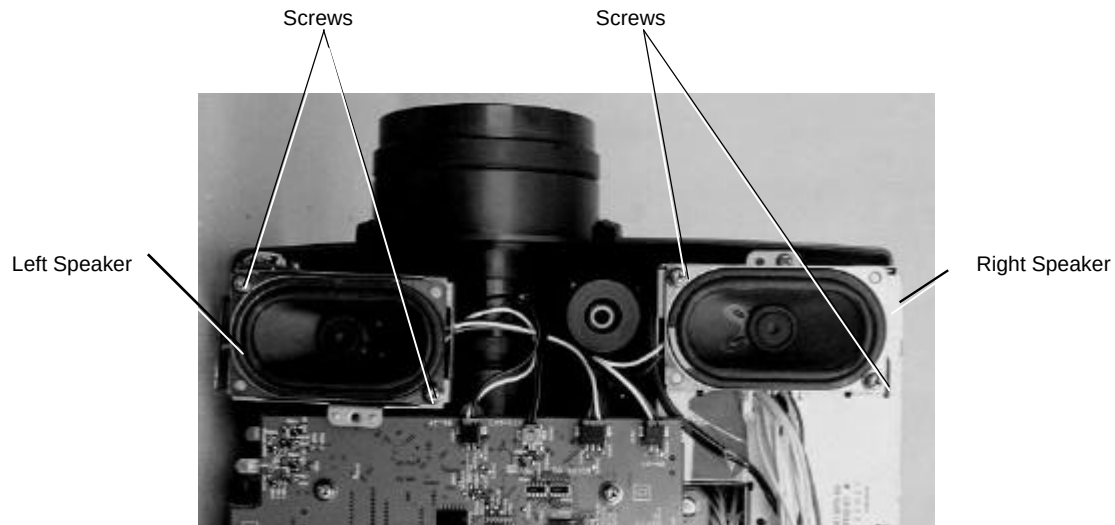


Figure 3-15

Right Speaker

1. Remove 2 screws mounting the right speaker unit.
Screws: +M3×4 F/ZN: P/N1021795
(mounting torque: 4.0 kg. cm = 3.5 lb. inch)
2. Disconnect the speaker cable from CN602 on the main board.

Left Speaker Unit

1. Remove 2 screws mounting the left speaker unit.
Screw: +M3×4 F/ZN: P/N1021795
(mounting torque: 4.0 kg. cm = 3.5 lb. inch)
2. Disconnect the speaker cable from CN601 on the main board.

Caution:

- 1) The speaker unit has a permanent magnet. Keep it away from electromagnetic media such as floppy disks and magnetic cards.
- 2) When mounting a speaker, align the 2 speaker holes with those of the frame, then secure them with same tightening torque.

3.2.8 Removing the Main Board

Prerequisite conditions: 3.2.3/3.2.4

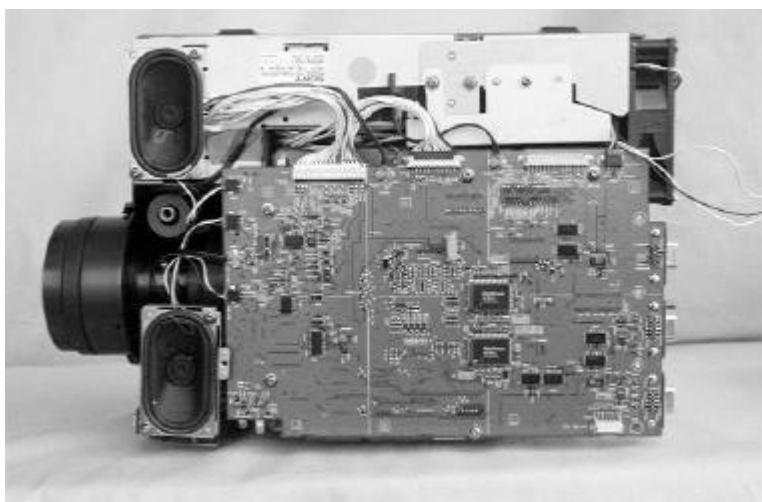


Figure 3-16

1. Disconnect all cable connectors from the main board.
(Refer to Figure 3-10.)

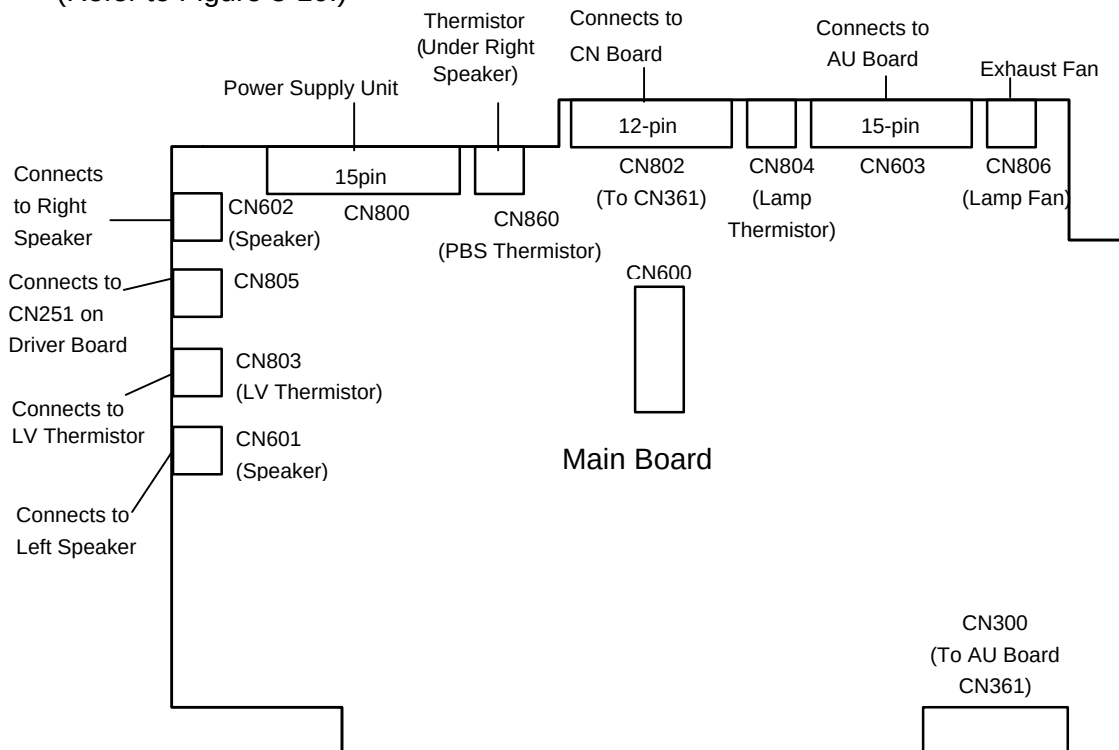


Figure 3-17

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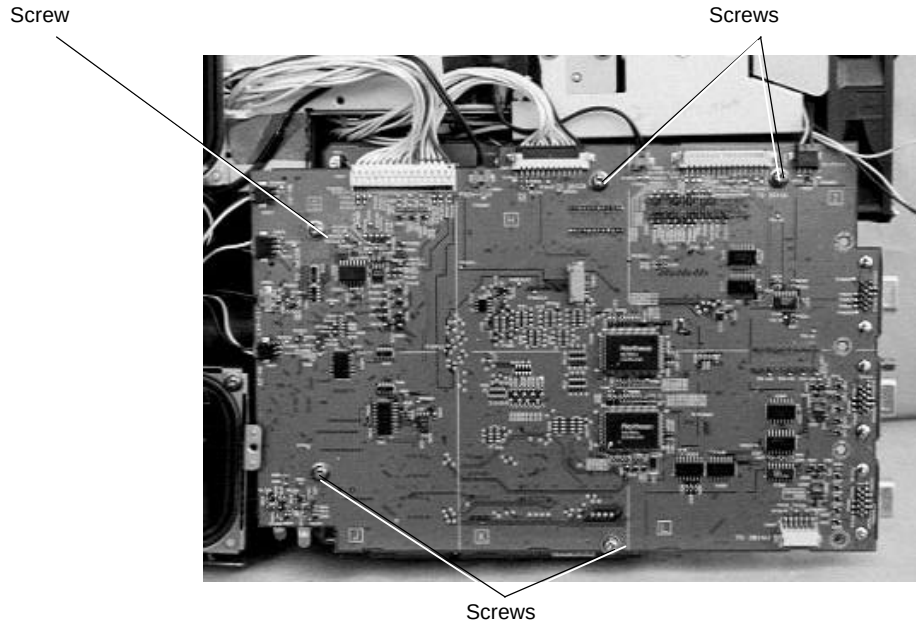


Figure 3-18

2. Remove 5 mounting screws from the main board.
Screws: +M3×4 F/ZN Sems P/N 1021795
(mounting torque: 4.0 kg. cm = 3.5 lb. inch)
3. Grasp the main board on the left side and disconnect the connector from the driver board.

Caution:

To avoid malfunctions caused by wire breaking or solder flaking, never apply any mechanical stress to the main board.

3.2.9 Removing the AU Board

Prerequisite conditions: 3.2.3/3.2.4

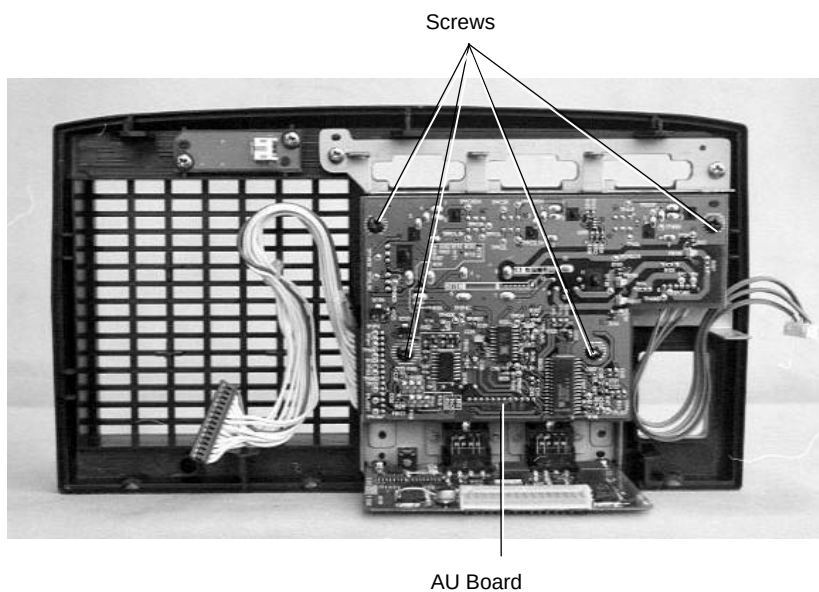


Figure 3-19

1. To detach the AU board, remove 4 screws from it and lift it off.
Screws: +M3×8 F/ZN Bind: P/N1021795
(mounting torque: 6.0 kg. cm = 5.2 lb. inch)

3.2.10 Removing the Receptor Board Assembly (FI Board / RI Board)

Prerequisite conditions: 3.2.3/3.2.4/(RI board only)

FI Board (Located on the speaker bracket)

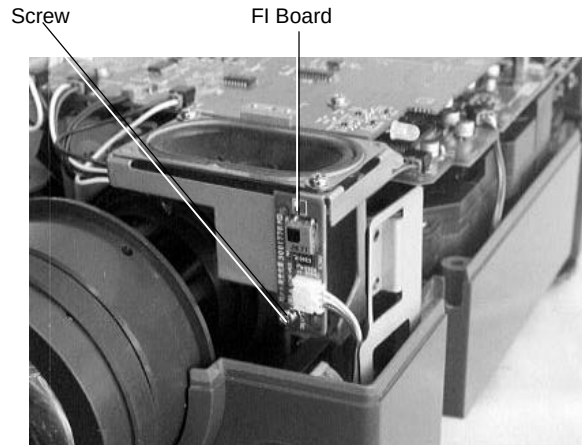


Figure 3-20

1. Disconnect the cable connector from the FI board.
2. Remove the screw mounting the FI board to the speaker bracket.
Screw: +M3×5 F/ZB: P/N1021795
(mounting torque: 4.0 kg. cm = 3.5 lb. inch)

RI Board (Located on the rear cover)

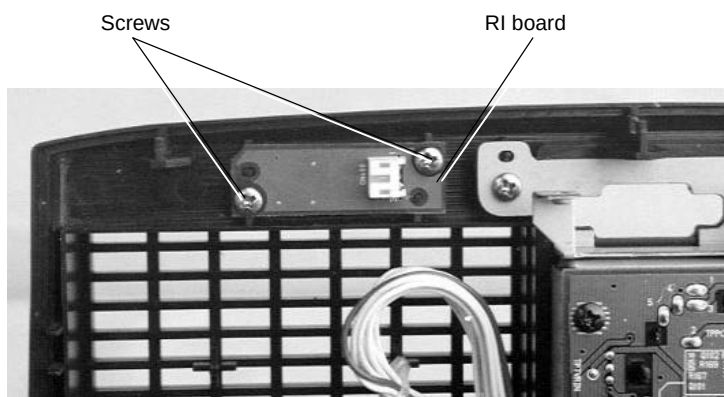


Figure 3-21

1. Disconnect the cable connector from the RI board.
2. Remove the screws mounting the RI board to the speaker bracket.

Screws: +M3×5 F/ZB Bind: P/N 1033703
(mounting torque: 6.0 kg. cm = 5.2 lb. inch)

Caution:

When installing the receptor board assembly, align the hole in the board with the boss on the frame before tightening the screws.

3.2.11 Removing the FR Board

Prerequisite conditions: 3.2.3/3.2.4/3.2.9

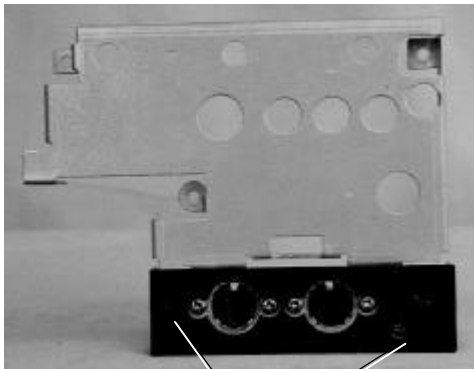


Figure 3-22

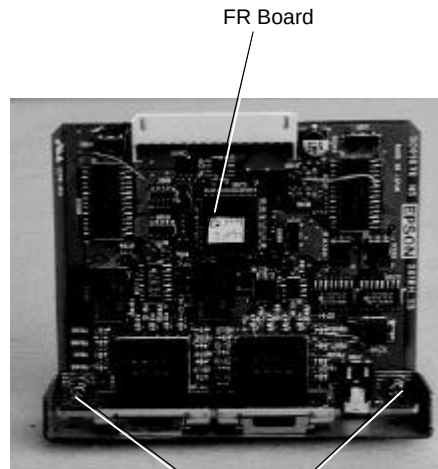


Figure 3-23

1. Pull out the FR board with the audio board shield plate from the rear case.
2. To detach the remote board cover from the audio board shield plate, remove 2 screws from them.

Screws: +M3×4 F/ZN Bind: P/N 1021795
(mounting torque: 4.0 kg. cm = 3.5 lb. inch)

3. To separate the remote board shield plate from the FR board, remove 2 screws from them.

Screws: +M3×8 F/ZN: P/N 1021795
(mounting torque: 4.0 kg. cm = 3.5 lb. inch)

3.2.12 Removing the Power Supply Unit / PBS Thermistor

Prerequisite conditions: 3.2.3/3.2.4/3.2.8/3.2.7 (right speaker)

Power Supply Unit

Screws

Case Holding Plate

Sensor Shield Plate

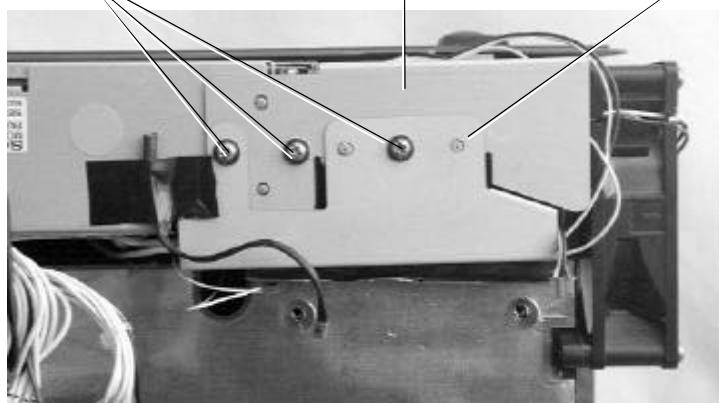


Figure 3-24

1. Remove the screw from the sensor shield plate, then pull it out.
2. Remove 2 screws from the case holding plate, then pull the case holding plate straight up.

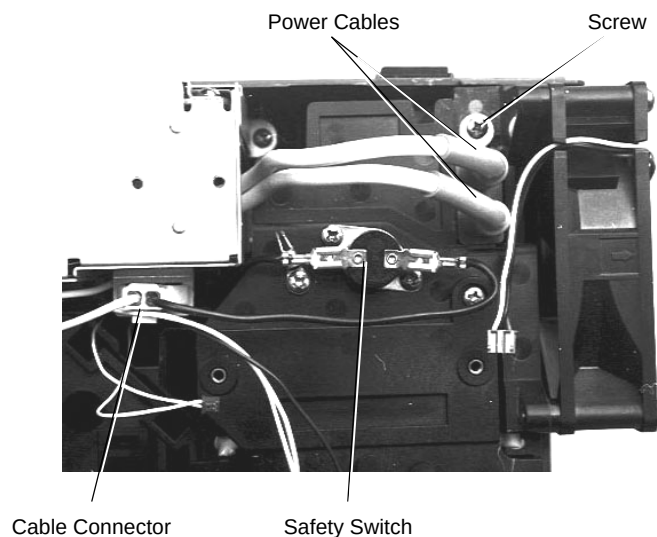


Figure 3-25

3. To pull out the power cable connector for the lamp, remove the screw and washer mounting the connector.
4. Disconnect 2 wire cables connected to the safety switch.
5. Disconnect the cable connector (black/white) connected to the power supply unit.

Caution:

When removing the screws, do not let them drop inside the power supply unit.

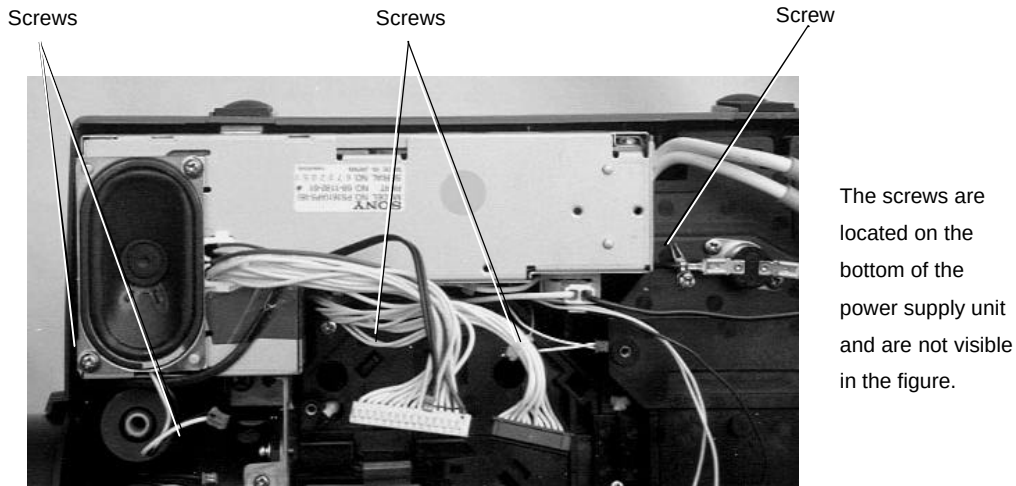


Figure 3-26

6. Remove 5 screws mounting the power supply unit to the lower case.

Screws (4P.C.S.): M3×8 F/ZN Bind: P/N1021824

(mounting torque: 6.0 kg. cm = 5.2 lb. inch)

Screws (1P.C.S.): M3×12 F/ZB Bind: P/N1033692

(mounting torque: 6.0 kg. cm = 5.2 lb. inch)

7. Remove the power supply unit by lifting it straight up.

Caution:

When removing the power supply unit, do not bend or damage the two bosses on the lower case unit. When installing the power supply unit, align the holes with the bosses. The intake fan and its peripheral parts are susceptible to dust and dirt. When installing the power supply unit, check the fan's cleanness and clean it if necessary.

PBS Thermistor

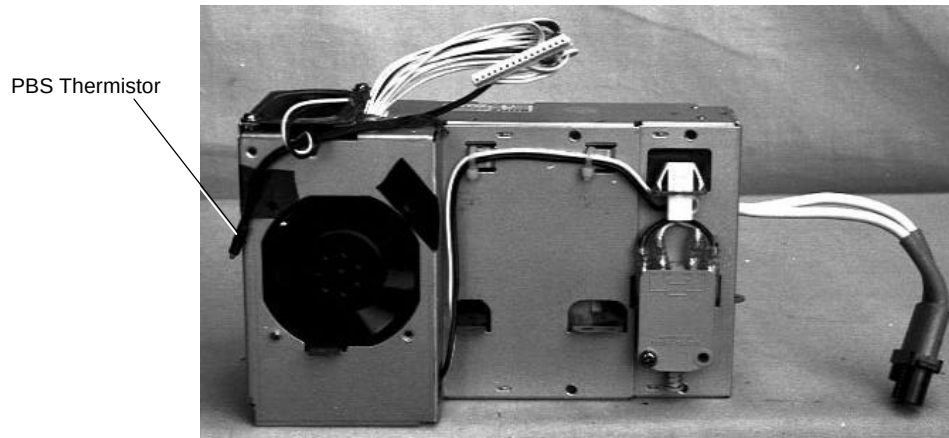


Figure 3-27

1. Remove the cable clamp screw mounting the PBS thermistor to the power supply unit chassis.
2. Separate the PBS thermistor from the cable clamp.
3. Disconnect the cable from connector CN860 on the main board.

3.2.14 Removing the Lamp Thermistor

Prerequisite conditions: 3.2.3/3.2.4/3.2.8/3.2.13

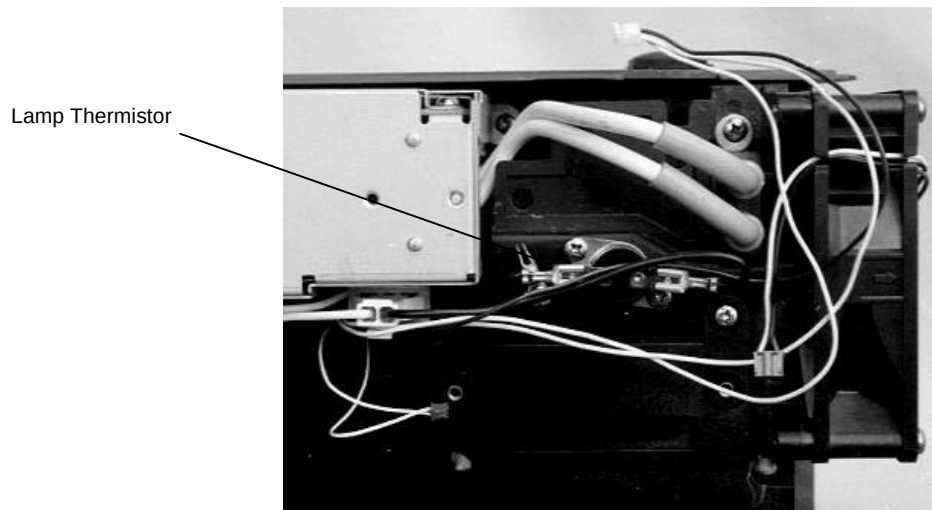


Figure 3-28

1. Remove the screw mounting the lamp thermistor to the light guide unit.
Screw: +M3×8 F/ZB: P/N 1033691
(mounting torque: 6.0 kg. cm = 5.2 lb. inch)
2. Disconnect the cable from connector CN804 on the main board.

3.2.16 Removing the Safety Switch

Prerequisite conditions: 3.2.3/3.2.4/3.2.8/3.2.13

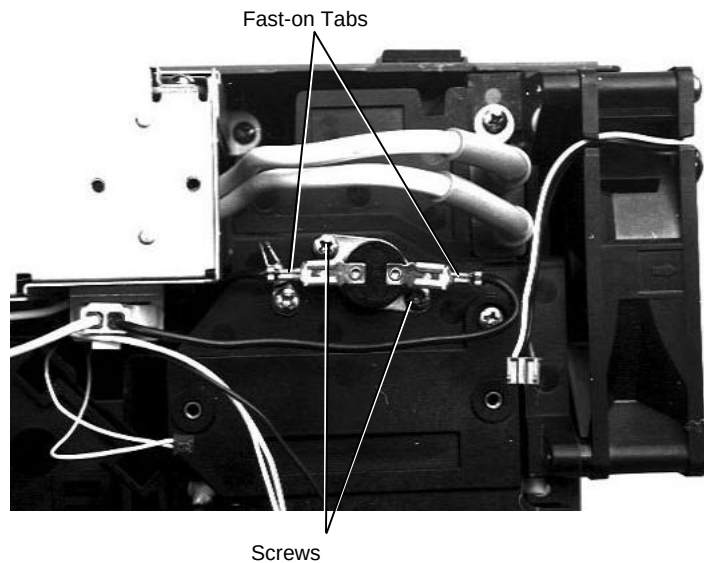


Figure 3-29

1. Disconnect the Fast-on tab terminals of the two cables connected to the safety switch.
2. Remove the two mounting screws from the safety switch and detach the safety switch.
Screw: +M3×8 F/ZB: P-Tight P/N 1033691
(mounting torque: 6.0 kg cm = 5.2 lb inch)

Caution:

When removing the Fast-on terminals, do not apply excess force to the terminals on the safety switch in the horizontal or vertical direction.

Note:

The polarity of the cables is not significant; connect them to any terminals on the safety switch.

3.2.17 Removing the Optical Engine

Prerequisite conditions: 3.2.3/3.2.4/3.2.8/3.2.13/3.2.7 (left)

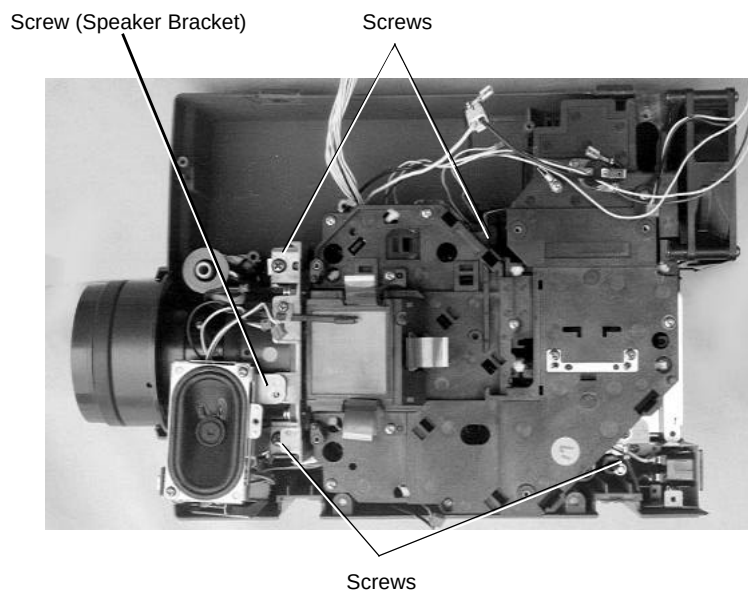


Figure 3-30

1. Remove the screw mounting the speaker bracket to the optical head chassis.
Screw: +M3×4 F/ZN: P/N 1021795
(mounting torque: 4.0 kg. cm = 3.5 lb. inch)
2. Remove the 4 optical block-mounting screws.
(One of the screws is located on the front side of the speaker bracket.)
Screws: +M5×10 F/ZN Bind: P/N 1033704
(mounting torque: 6.0 kg. cm = 5.2 lb. inch)
3. Pull out the speaker bracket.
4. Pull the optical engine straight up from the lower case.

Optical Block (Except Exhaust Fan)

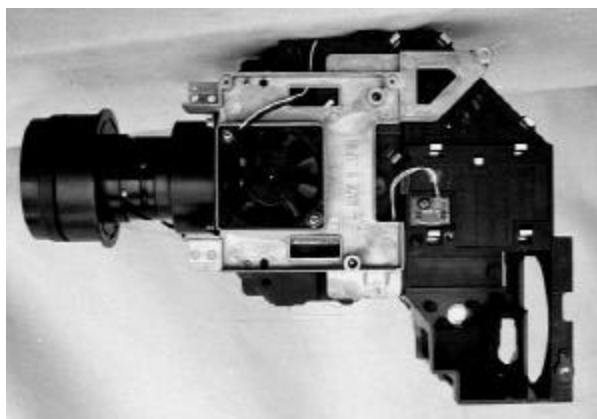


Figure 3-31

3.2.18 Removing the Filter Board

Prerequisite conditions: 3.2.3/3.2.4/3.2.8/3.2.12/3.2.13/3.2.17

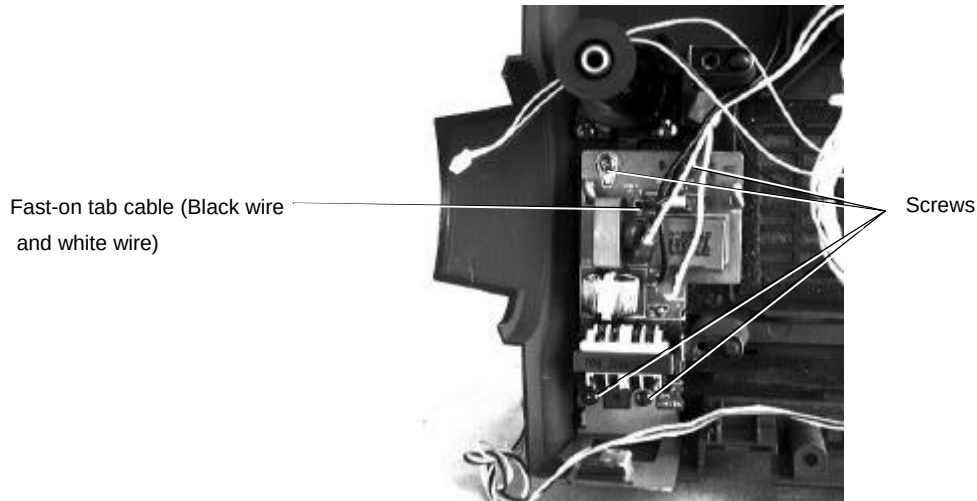


Figure 3-32

1. Unplug the Fast-on tab cable (black wire and white wire) from the filter board.
2. Remove the 4 mounting screws.
Screws: +M3×8 F/ZN Bind: P/N 1021824
(mounting torque: 6.0 kg. cm = 5.2 lb. inch)
3. Pull up the filter board holding plate.
4. Remove the cables from the cable clamp.
5. Remove the filter board from the lower case.

Caution:

When installing the filter board, arrange the cables in the clamp and cable guide.

3.2.19 Removing the Inlet Unit

Prerequisite conditions: 3.2.3/3.2.4/3.2.8/3.2.13/3.2.17

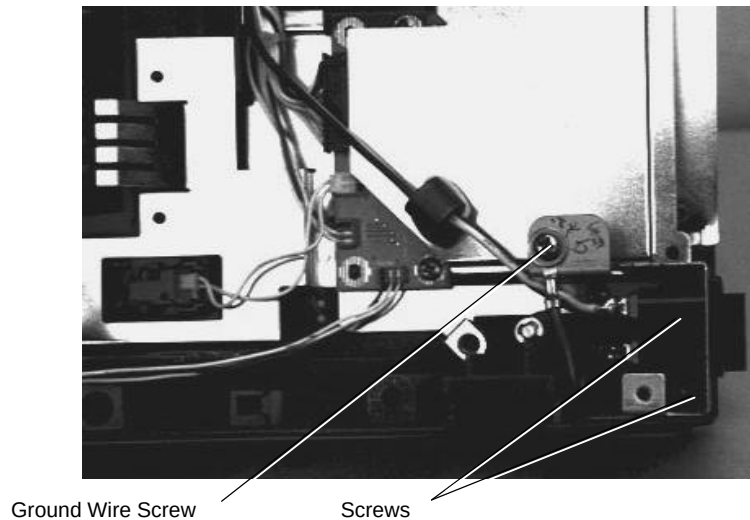


Figure 3-33

1. Remove 2 inlet unit mounting screws and the ground wire screw.
2. Remove the cable guide cover.
3. Unplug the Fast-on tab cable (white wire) and the black wire from the filter board.
4. Pull up the inlet unit from the lower case.

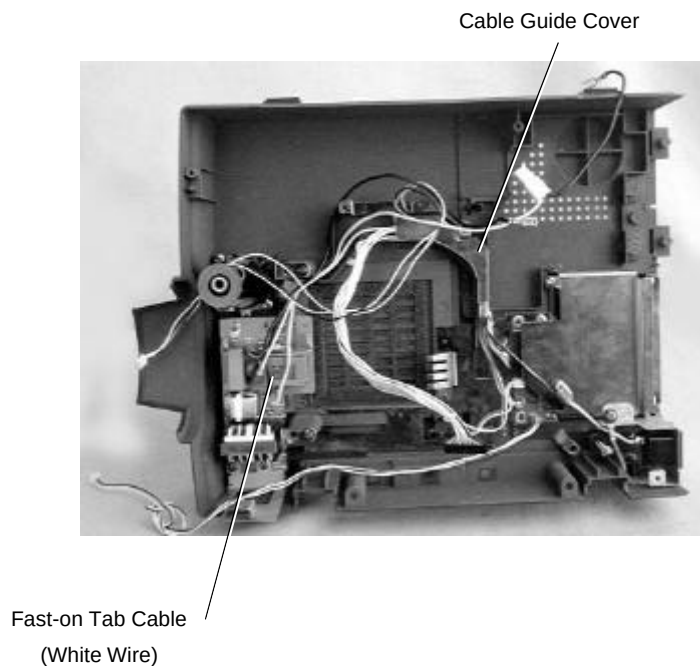


Figure 3-34

3.2.20 Removing the CN Board

Prerequisite conditions: 3.2.3/3.2.4/3.2.8/3.2.13/3.2.17

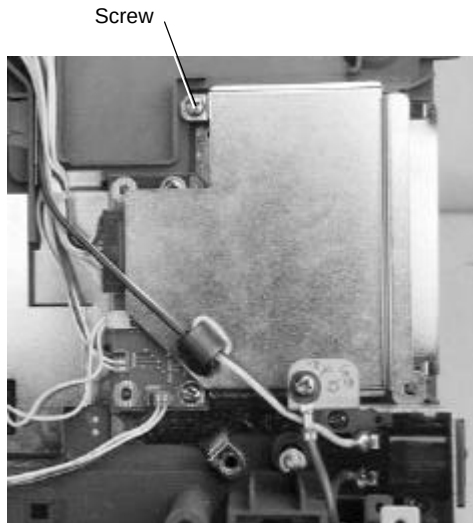


Figure 3-35

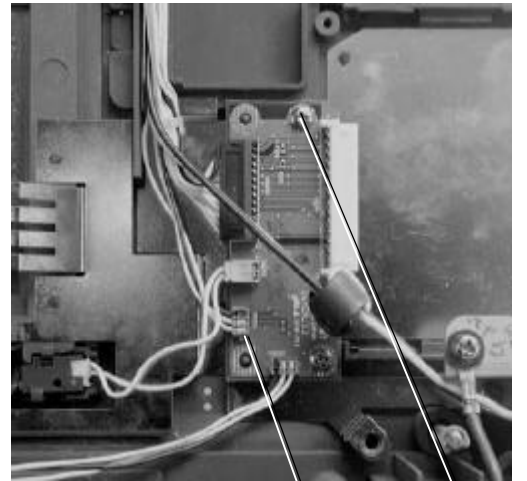


Figure 3-36

1. Remove the screw mounting the CN board shield plate B.
Screw: +M3×5 F/ZN Bind: P/N 1033703
(mounting torque: 6.0 kg. cm = 5.2 lb. inch)
2. Disconnect the cable connectors connected to CN200/202 on the CN board.
3. To detach the CN board, remove the 2 screws mounting it to the projector.

Caution:

Arrange the cables in the cable guide.

3.2.21 Removing the Air Filter Flame Unit Switch (Filter Cover Switch)

Prerequisite conditions: 3.2.3/3.2.4/3.2.8/3.2.13/3.2.17

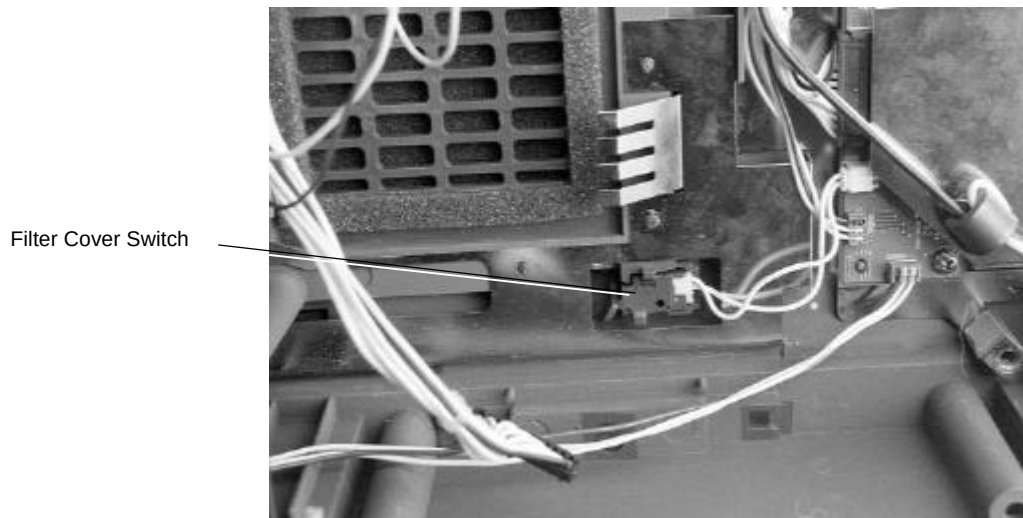


Figure 3-37

1. Disconnect the cable connector from the switch connected to CN202 on the CN board.
2. Remove the filter cover switch, pushing the latches on the lower case outward.

Caution:

Be careful not to break the latches with excessive stress. When you replace the filter cover switch, align the hole to the boss on the lower case.

3.2.22 Removing the FC Board

Prerequisite conditions: 3.2.3/3.2.4/3.2.8/3.2.13/3.2.17

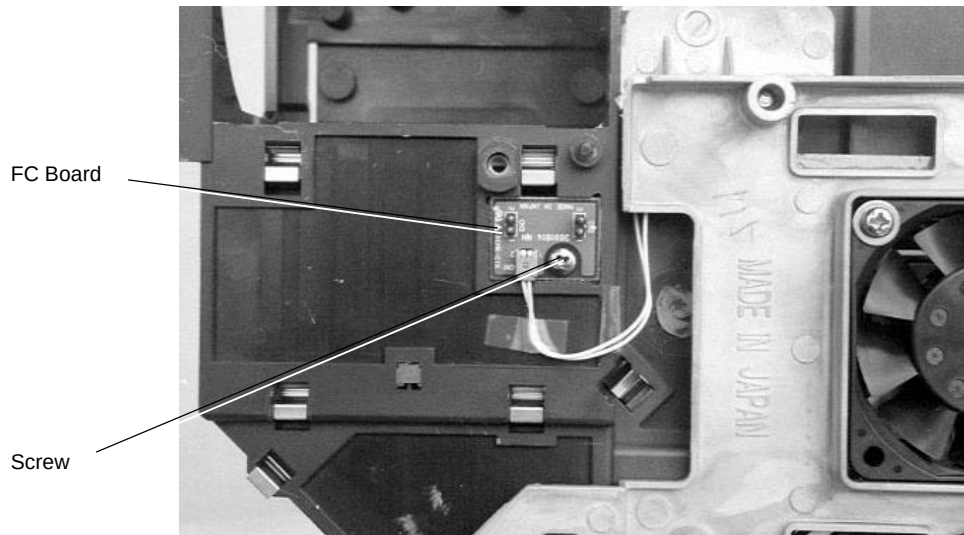


Figure 3-38

1. Disconnect cable connector CN1 from the FC board.
2. To detach the FC board, remove the screw.

4.1 Before Starting Troubleshooting Procedures

1. Whenever you replace a unit or block for maintenance, double-check the replaced unit or block to make sure it is defective (not inoperable due to a poor cable connection or other problem).
2. If you have questions while examining the flowchart, check the items in question during the troubleshooting procedure.
3. Refer to the instructions in Chapter 3, "Disassembly and Assembly," when replacing a component unit.
4. Before making a functional check, be sure to check connections.

4.1.1 Tools and Accessories Required for Troubleshooting

The tools and accessories required for troubleshooting (including fault isolation) are listed below. They need to be prepared by the user.

Table 4-1

Name	Quantity	Use/Remarks
Projector screen	1	To project images
Tape Measure 10 ft (3 m)	1	To measure the projection distance
Host computer	1	To supply test patterns (PC or compatible)
Color display	1	To manipulate and display on host computer
Video equipment	1	To test video input (video deck, video camera, etc.)
External speaker unit	1	To test voice output (with audio cable terminals)
Multimeter	1	To measure resistance and voltage (AC/DC)
Tool set	1 set	Tools and accessories listed in Section 3.1

4.1.2 Field Replacement Parts

For parts that need be replaced during troubleshooting, such as boards, cases, plates, and screws, refer to the parts list in the appendix of this manual.

The optical engine (light guide unit, optical head unit, projector lens unit, prism unit and driver board) is one maintenance unit. Do not separate any units from the optical engine.

4.2 Before Starting Troubleshooting Procedures

Follow the flowchart shown below when troubleshooting projector problems and proceed to the pertinent detailed flowchart (given on the next and subsequent pages).

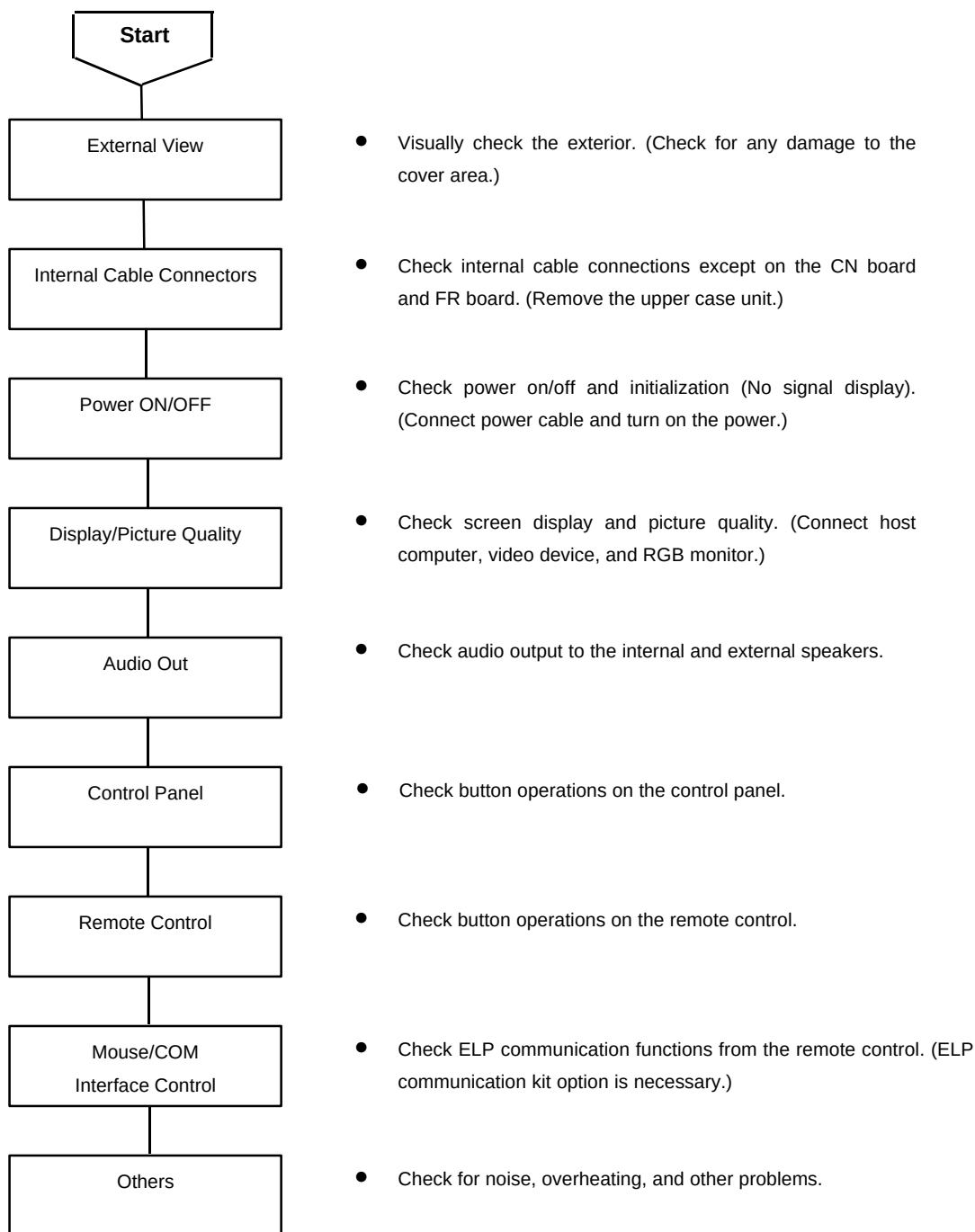
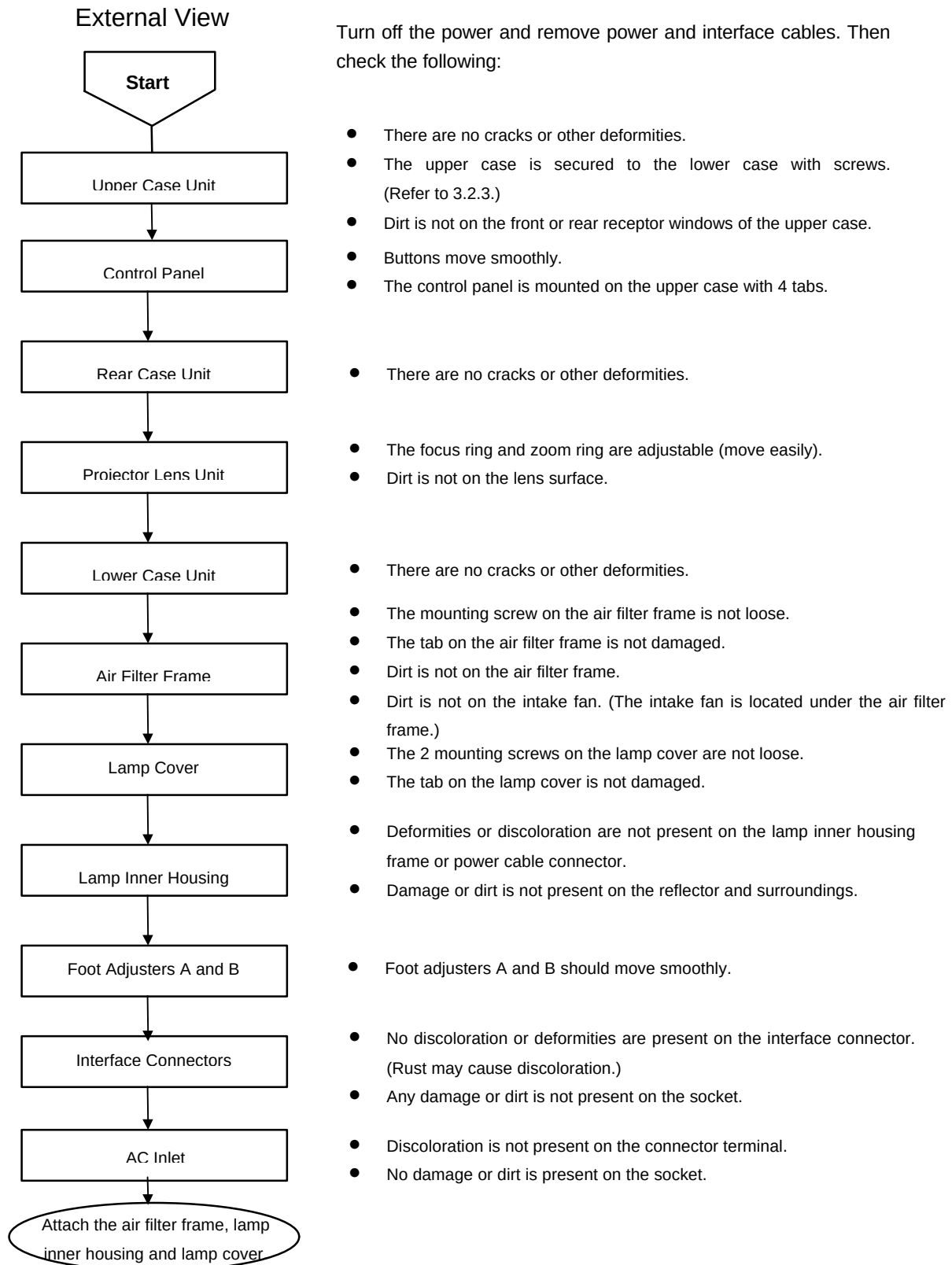
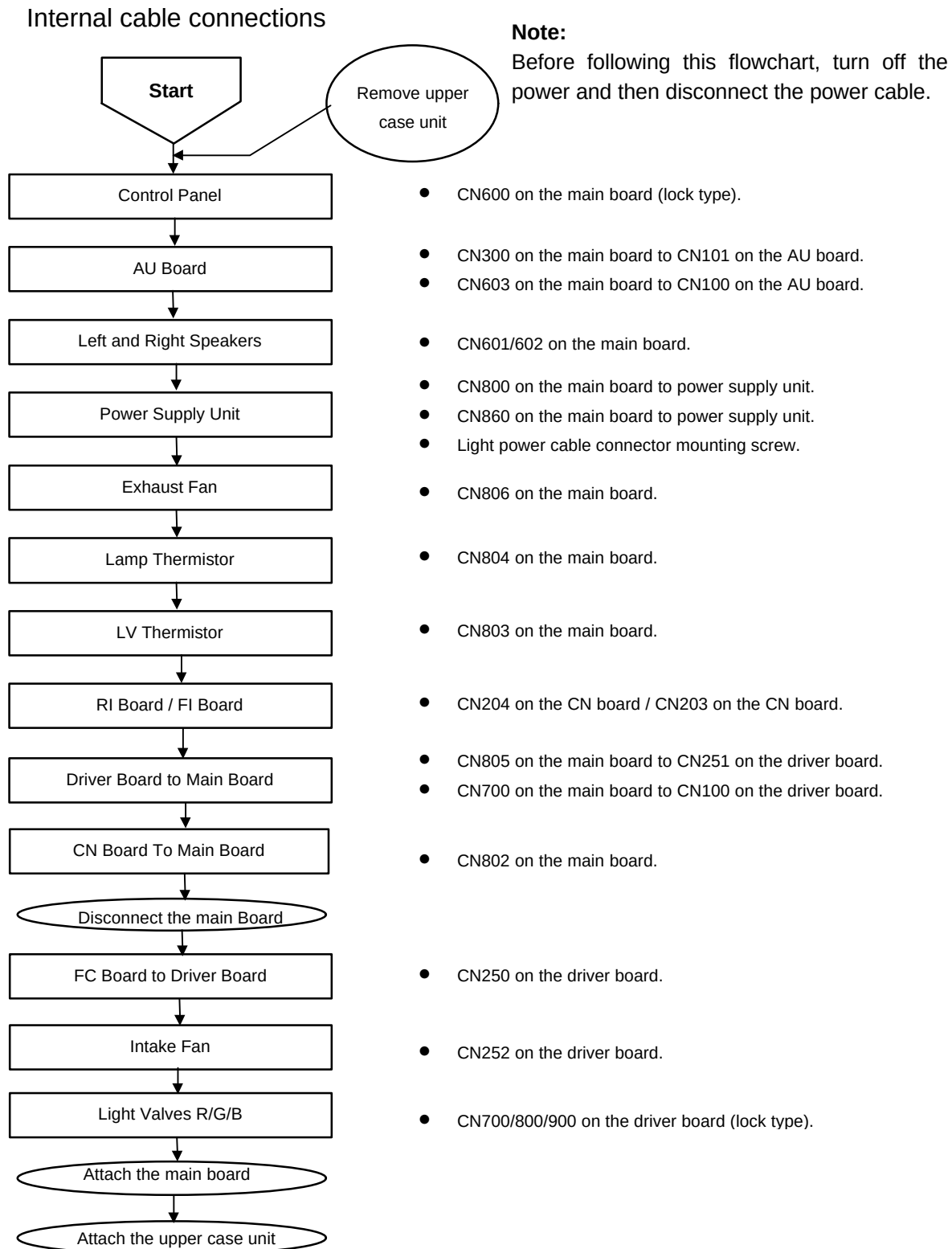


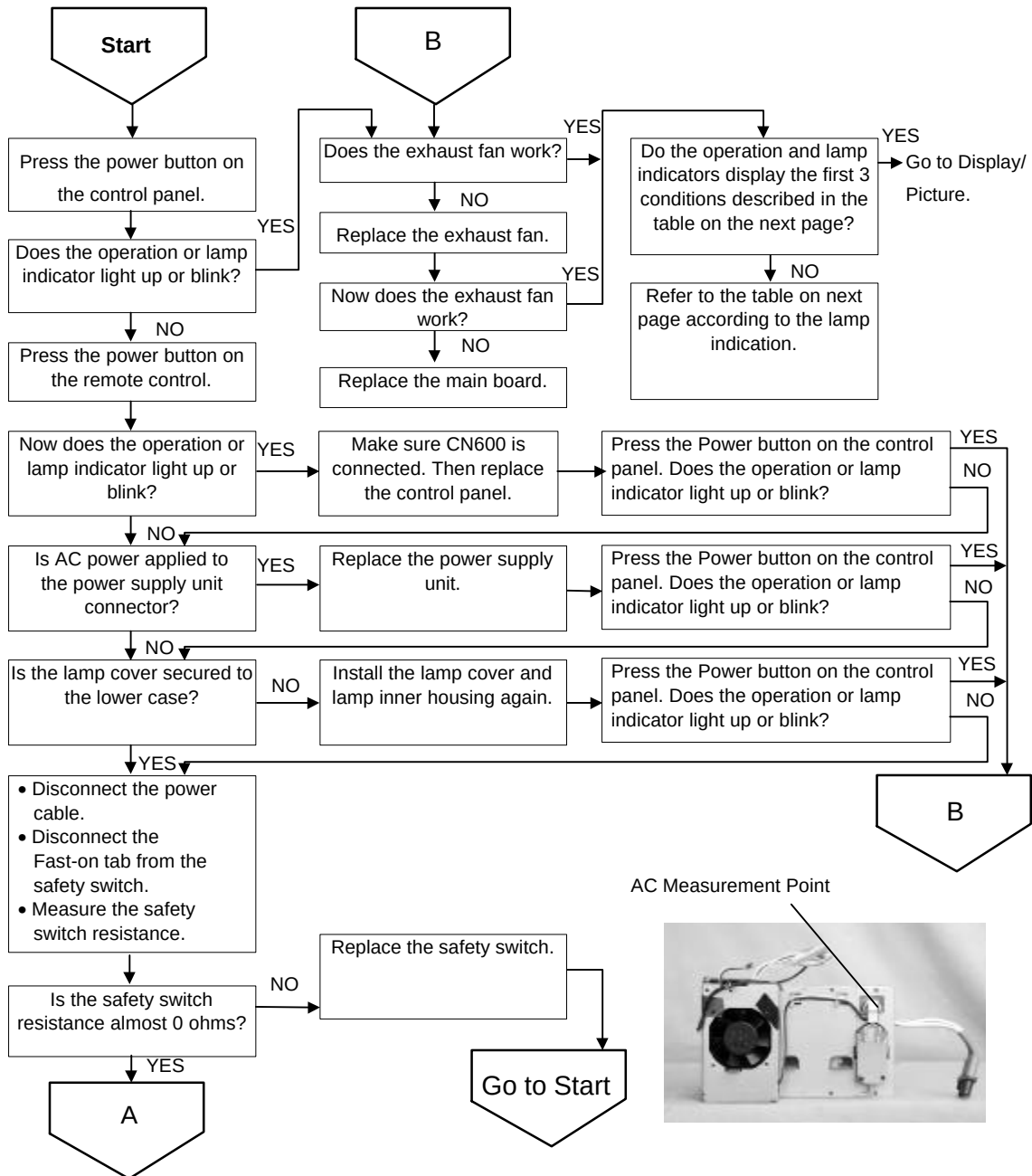
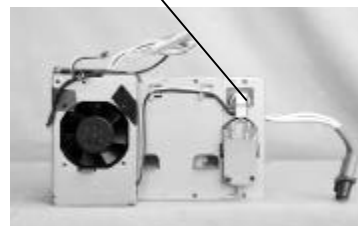
Figure 4-1



**Figure 4-3**

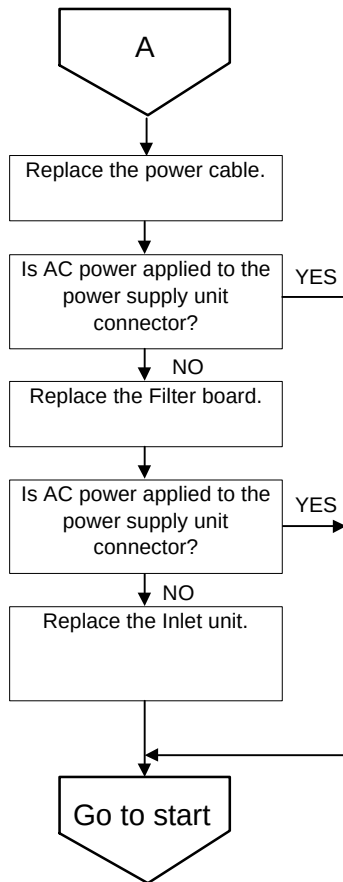
Power ON/OFF

Disconnect all interface cables and the projector lens cover.
Then connect the power cable.

**Figure 4-4****AC Measurement Point****Caution:**

Measure the resistance when the safety switch has cooled down.

Continued from page 4-5

**Figure 4-5****Lamp indication table**

Condition	Lamp indicator	Operation indicator	Meanings
1	OFF	Orange	System initialization.
2	Green-blinking	Green	Warm up operation.
3	Green	Green	Operating.
4	Orange-blinking	Orange	Cool down operation.
5	OFF	Orange	Standby. (Cool down complete)
6	OFF	OFF	Power off.
7		Red or Orange-blinking	Overheating.
8		Red-blinking	Circuit malfunction.
9	Orange and Red		Lamp timer has exceeded 1900 hours.
10	Red		Lamp life is finished.
11	Red-blinking		Lamp or power supply problem.

The following components may be causing problems in each condition:

Condition 1 or 8

Main board, driver board (optical engine), power supply unit.

Condition 2

Main board, power supply unit, lamp inner housing.

Condition 4

Exhaust fan, lamp thermistor.

Condition 6 (power-on problem)

AC input, power supply unit (including the interlock switch), main board, safety switch, filter board, inlet unit.

Condition 7 (Sometimes occurs during operation.)

Air filter frame (dirt), exhaust fan, power supply unit, main board, thermistor (LV/PBS/lamp)

Condition 9 or 10

Lamp inner housing, main board, FC board.

Condition 11

Power supply unit, lamp inner housing.

Display/Picture

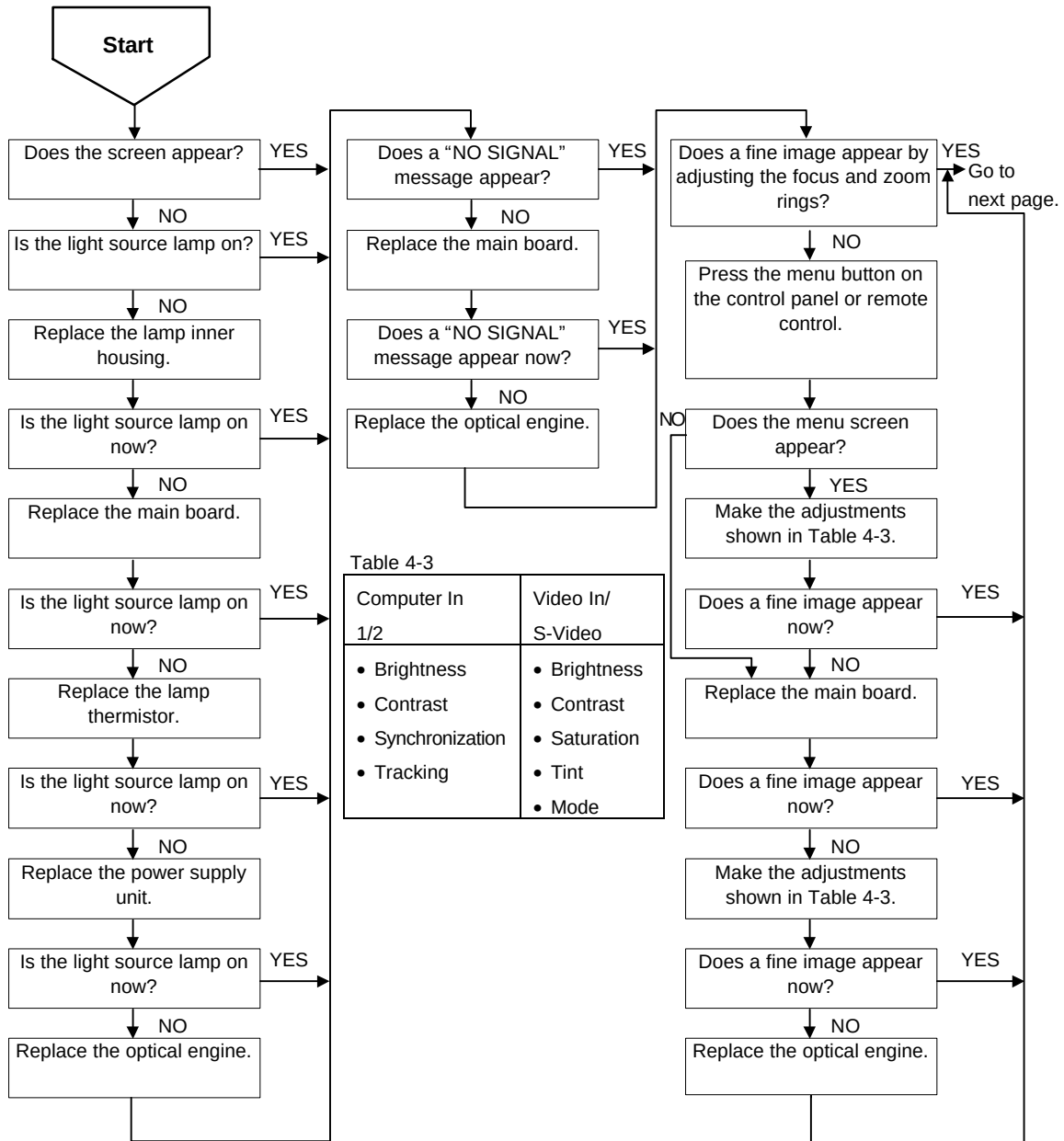


Figure 4-6

Continued from page 4-7

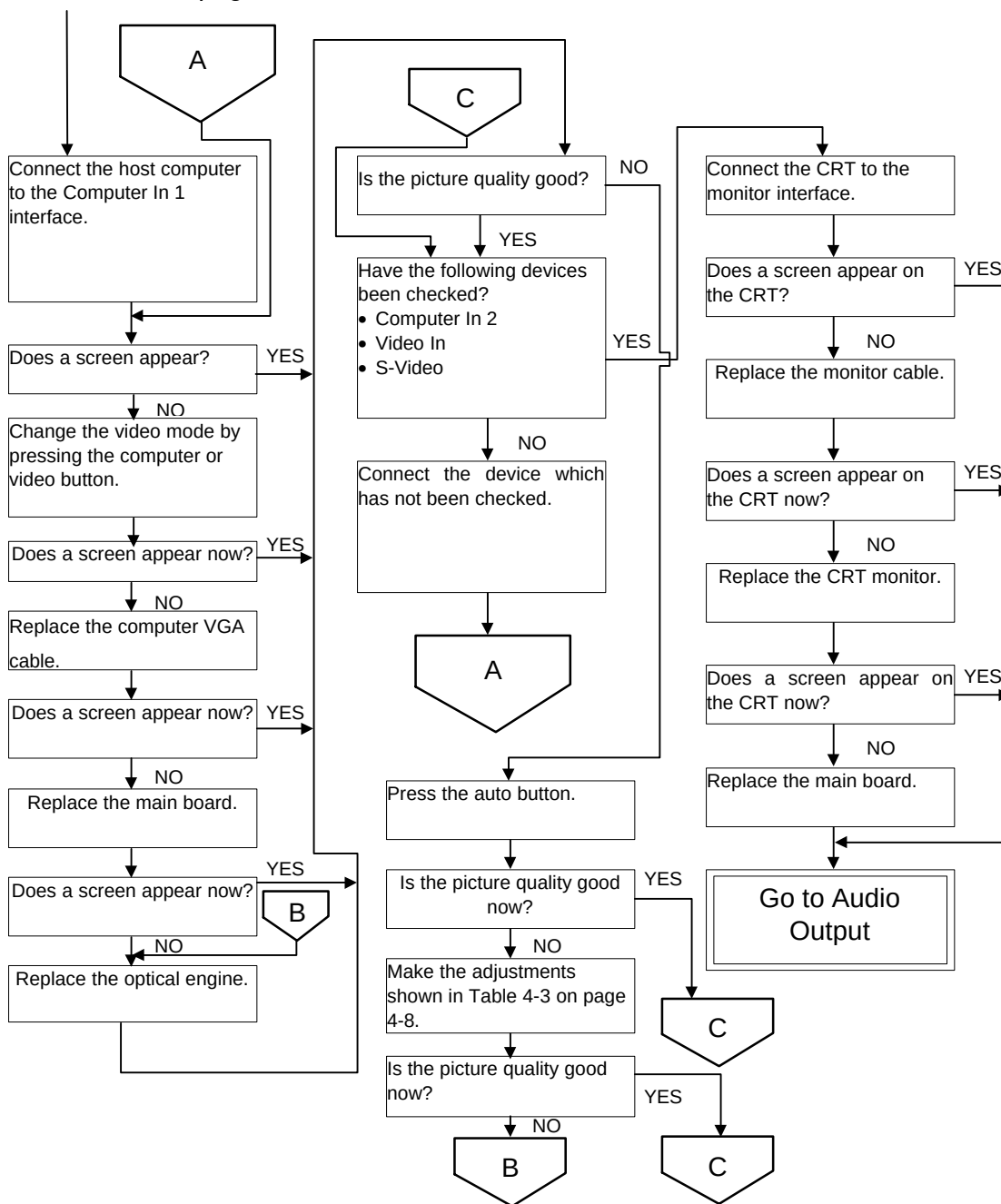


Figure 4-7

Audio Output

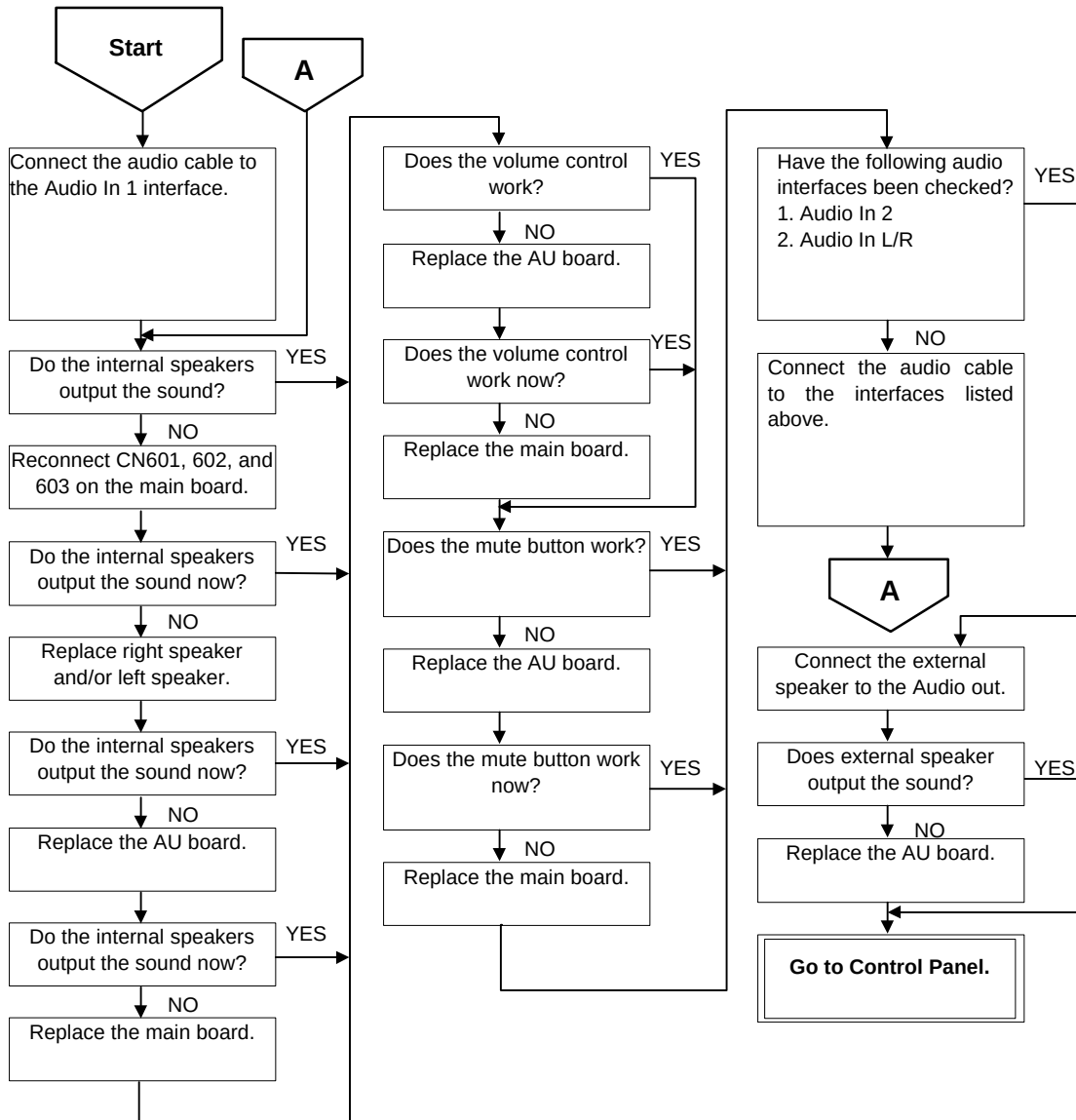


Figure 4-8

Control Panel

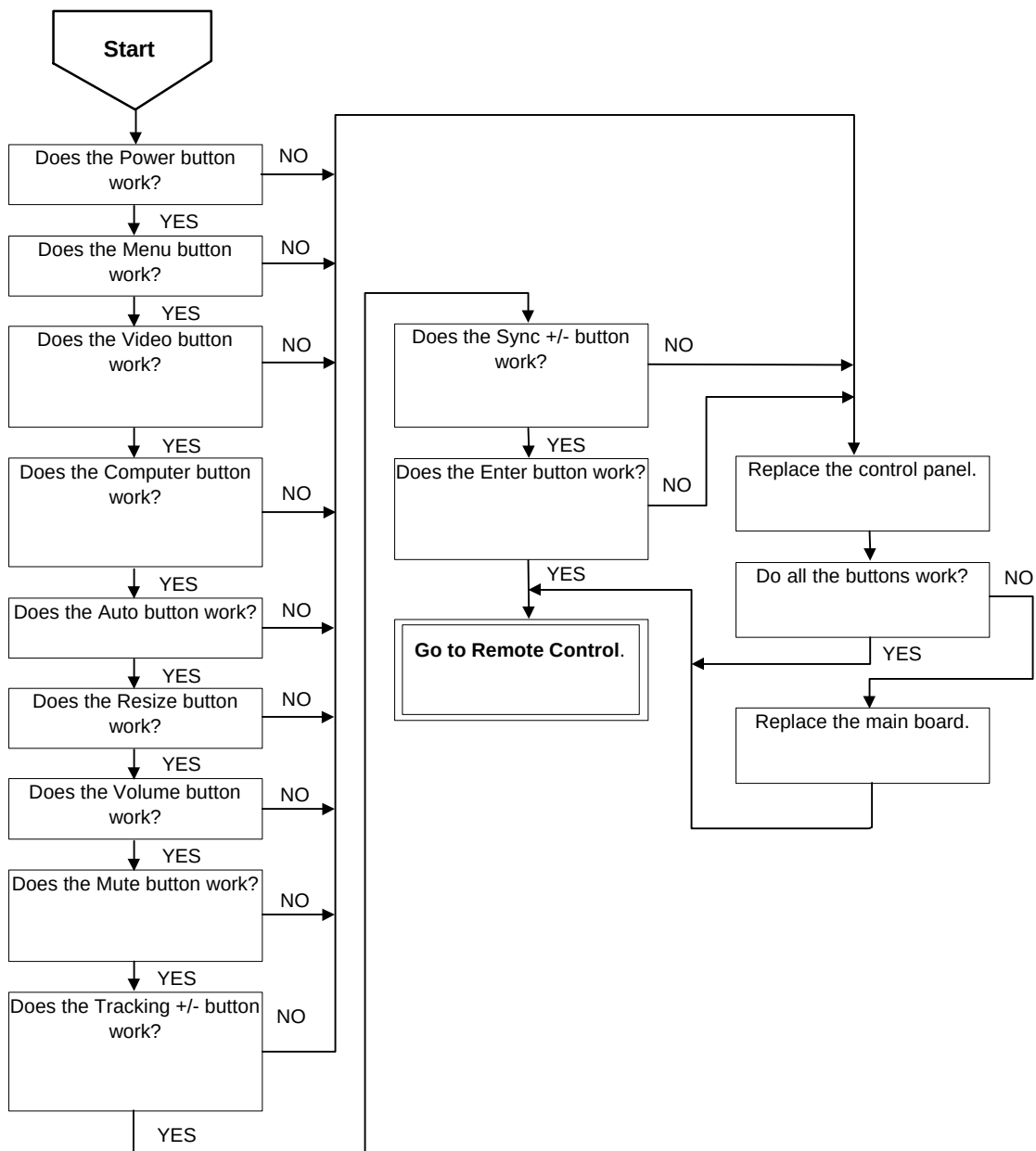


Figure 4-9

Remote Control

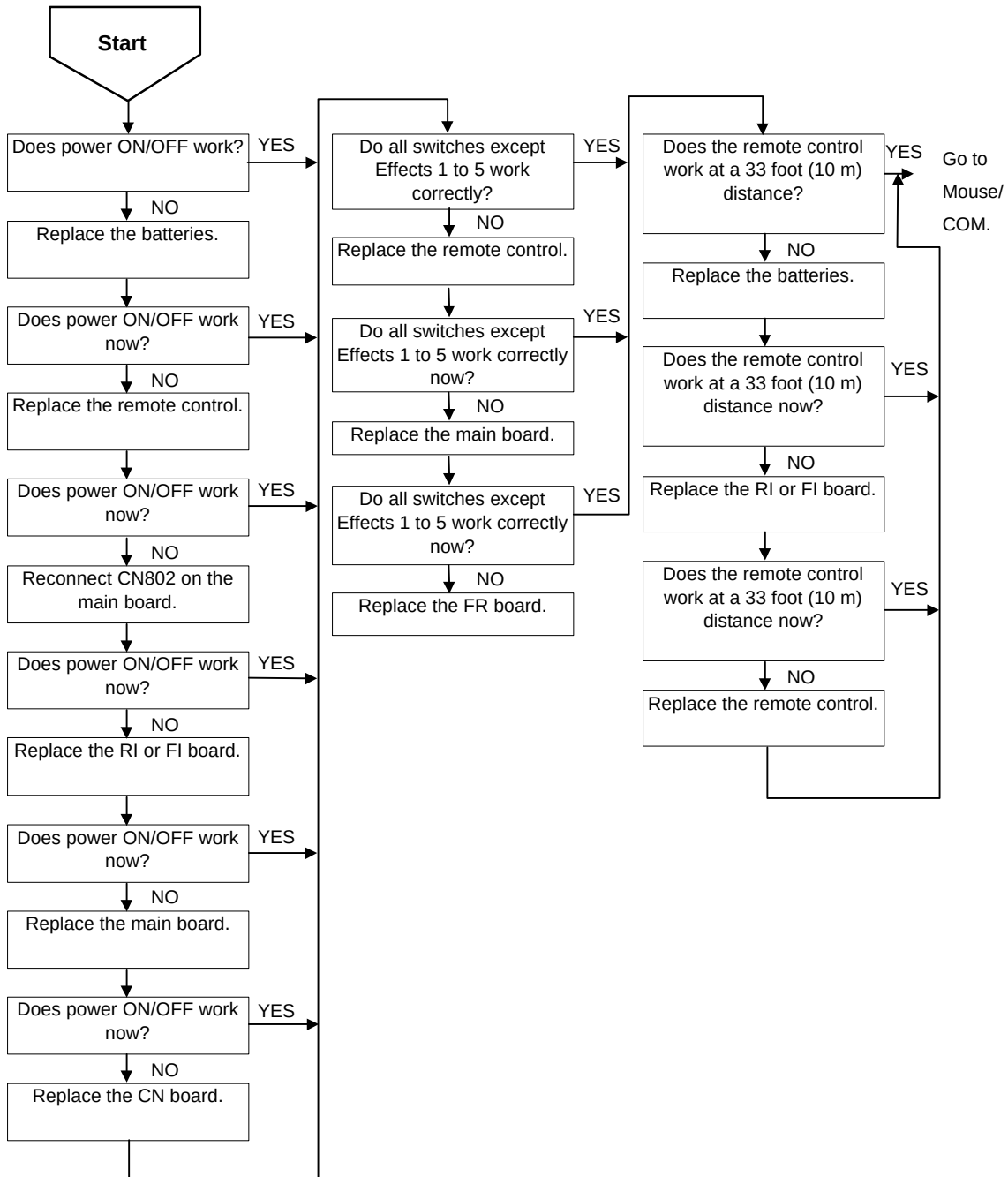


Figure 4-10

Mouse/COM

The ELP communication kit option is necessary.

If the option is not installed, ignore the following flowchart.

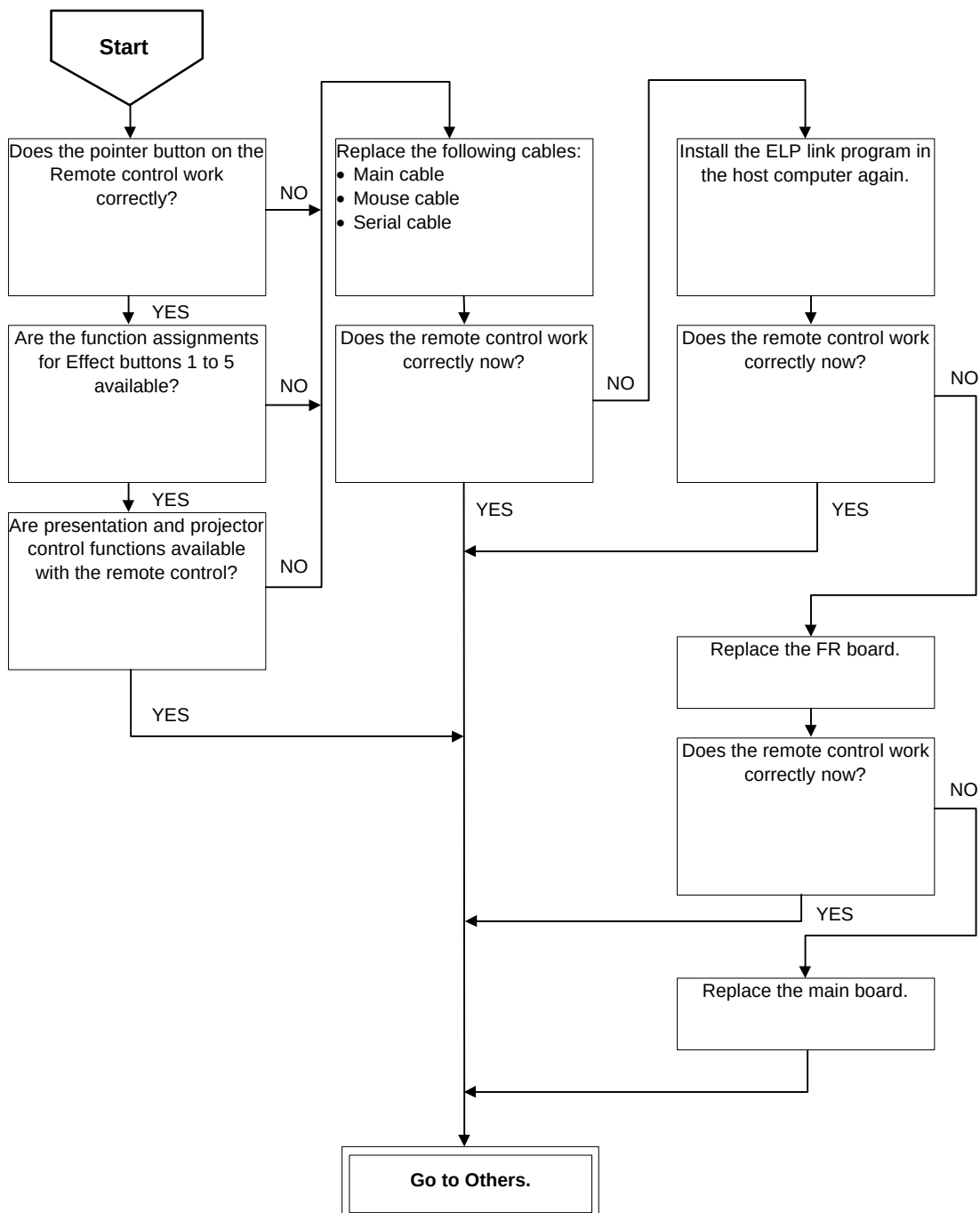


Figure 4-11

Others

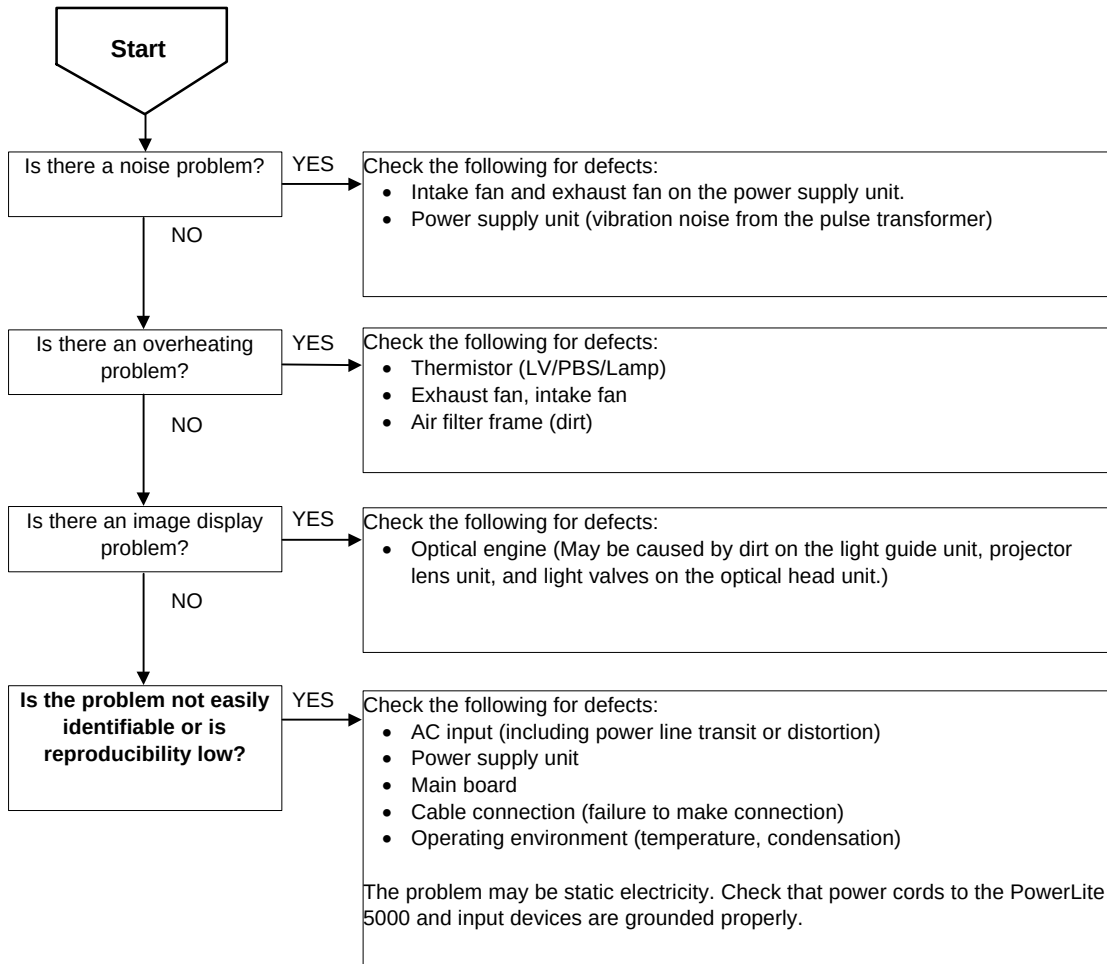


Figure 4-12

A.1 Parts List

The following table shows the parts that are available for the projector*. Appendix B of this manual, which contains the schematic diagrams for the projector, is available separately. (The part number is listed in the table below.)

Table A-1

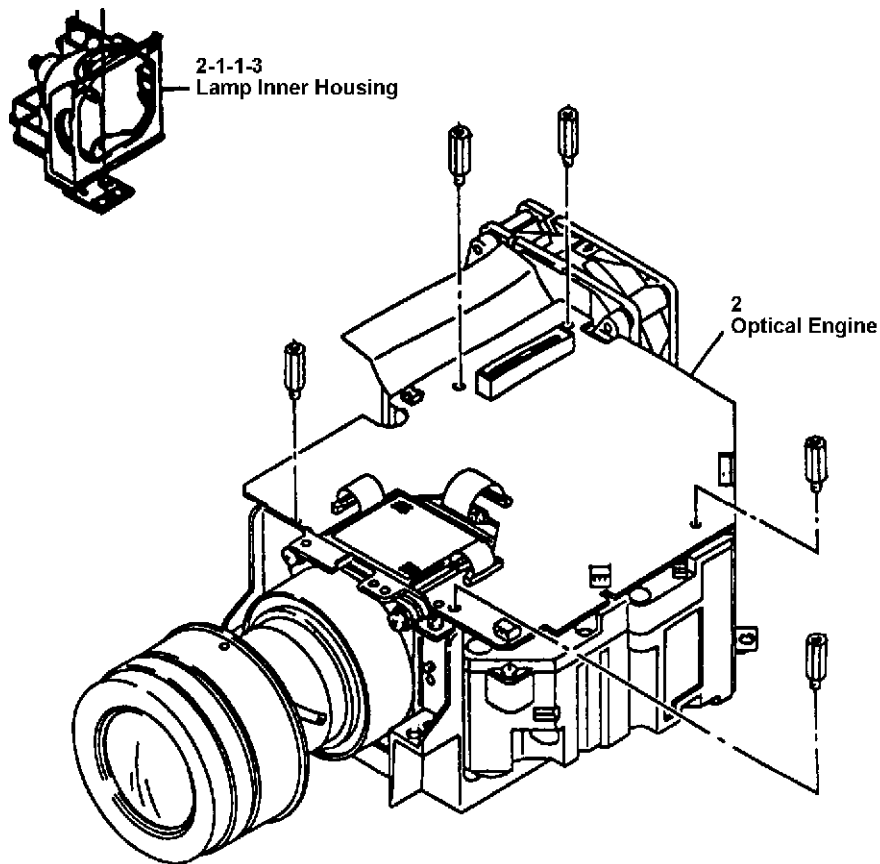
Reference No:	Part No.:	Description:
1	1031924	Lower Case Block
1-1	1031925	Lower Case Unit
1-1-1	1032096	Board Guide Sheet
1-1-10	1034026	Foot Case Mounting Screw
1-1-11	1032042	Foot Adjuster B
1-1-12	1034023	Stop Ring C
1-1-13	2023443	Filter Cover Switch Unit
1-1-14	1032043	Air Filter Frame Unit
1-1-15	1032046	Lamp Cover Unit
1-1-16	1032344	Handle
1-1-17	1021809	Handle Holder
1-1-18	1033021	Mini Clamp
1-1-2	1032070	Power Cable Shield Sheet
1-1-3	1034248	Filter Board Insulation Plate
1-1-4	1032027	Foot Adjuster A Unit
1-1-5	1032032	Foot Case
1-1-6	1032036	Foot Holder
1-1-7	1032037	Foot Pipe
1-1-8	1032039	Foot Spring
1-1-9	1032580	Stop Ring D
1-10	1034249	Filter B Insulation Plate
1-11	1021824	Mounting Screw
1-12	1021795	Filter Board B Mounting Screw
1-13	2023443	Filter Cover Switch Unit
1-14	1032043	Air Frame Filter Unit
1-15	1033581	Remote Board Shield Plate B
1-16	1034251	Shield Film
1-2	2024028	Connector Board Cable Assembly
1-2-1	3002149	Connector Board Assembly
1-3	1033703	Connector Board Mounting Screw
1-4	2023617	AC Cable Assembly
1-5	1032049	AC Inlet Holding Plate
1-6	1021824	Mounting Screw
1-7	1033025	GND Cable Mounting Screw
1-8	2023618	Filter Board Assembly A
1-9	1032753	Filter B Holding Plate
10	1032050	Case Holding Plate
11	1034260	Sensor Insulate Plate
12	1021795	Filter Board B Mounting Screw
13	1033691	Cable Assembly G Mounting Screw
14	1034027	Washer
15	1032051	Speaker Block
15-1	1032052	Speaker Holding Plate

15-2	2023192	ELP5000 Speaker
15-3	1021795	Filter Board B Mounting Screw
15-4	1034025	Speaker Cushion
15-5	1034398	Speaker Holding Insulator Plate
16	1021795	Filter Board B Mounting Screw
17	1021795	Filter Board B Mounting Screw
18	3001779	Receptor Board Assembly B
19	1021795	Filter Board B Mounting Screw
20	1032053	Rear Case Block
20-1	1032054	Rear Case Unit
20-10	1033583	RCA Jack Conduction Plate
20-11	3001779	Receptor Board Assembly B
20-12	1033703	Connector Board Mounting Screw
20-2	3002195	Audio Board Assembly
20-5	1032057	Audio Board Shield Plate
20-6	1021824	Mounting Screw
20-7	1021795	Filter Board B Mounting Screw
20-8	1021824	Mounting Screw
20-9	1032367	Audio Board Radiation Spring
21	1033691	Cable Assembly G Mounting Screw
22	1032134	D Sub Mounting Screw (Hexagon)
25	1032071	Upper Case Block
26	1033707	Upper Case Block Mounting Screw
27	1034318	Upper Case Block Mounting Screw
28	1032080	Control Panel
29	1034329	Control Panel Spring
30	3002147	Remote Board Assembly
31	1032368	Remote Board Shield Plate
32	1032350	Remote Board Cover
33	1021795	Filter Board B Mounting Screw
34	1034713	Remote Board Mounting Screw
35	1034319	Remote Board Cover Mounting Screw
36	1033584	Logotype Plate
8	1033646	Mini Clamp B
9	1034261	Mini Clamp B Mounting Screw
2	1034024	Optical Engine
2-1-13	1031985	ELP5000 Lamp
2-19	1031941	ELP5000 Lens Cap
23	3002143	Main Board Assembly
24	1021795	Filter Board B Mounting Screw
4	2023402	Power Supply Block
5	1021824	Mounting Screw
6	1033692	Power Supply Block Mounting Screw
7	2023440	Cable Assembly I
51	4006463	User's Manual Set
52	1032303	Seal Set
53	2017328	AC Power Cable
54	2016048	A.V. Cable (RCA Plugs)
55	1033569	ELP5000 Remote Control
56	2023359	Mac Adapter Set
57	2022604	Computer Cable (VGA Cable)

58	2022956	Audio Cable (3.5mm Plugs)
59	2024268	ELP Communication Kit
61	2023367	ELP5000 Main Cable
62	2023368	ELP5000 PS/2 Mouse Cable
63	2023369	ELP5000 Serial Mouse Cable
64	2023370	ELP5000 Mac Mouse Cable
65	2023642	ELP5000 Serial Cable
66	2023643	ELP5000 Mac Serial Cable
67	2024409	ELP5000 3.5" FD Set
37	5005532	Carton Box Set
38	5005534	Lower Pad
39	5005535	Upper Pad
40	5005543	Accessory Box (Big)
41	5005333	Accessory Holder
42	5004108	Polyvinyl Bag
43	5003353	Soft Bag
44	4006453	Slipsheet
45	1032291	UPC Code Label
46	1032295	Caution Label A (Lamp Exchange)
47	1034263	Caution Label B (Don't Lock)
48	1034264	Caution Label C (Don't Open Case)
49	1034043	Caution Label D
50	1026940	Road Service Sticker
64	1033745	Serial Number Label B (w/barcode)
65	1034757	Pallet Label
66	1034758	RC Label
—	SM-ELP5000A	PowerLite 5000 Service Manual: Appendix B

* Contents of the Parts List are subject to change without notice.

A.2 Exploded Diagrams



OPTICAL BLOCK

Figure A-1

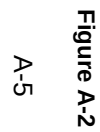
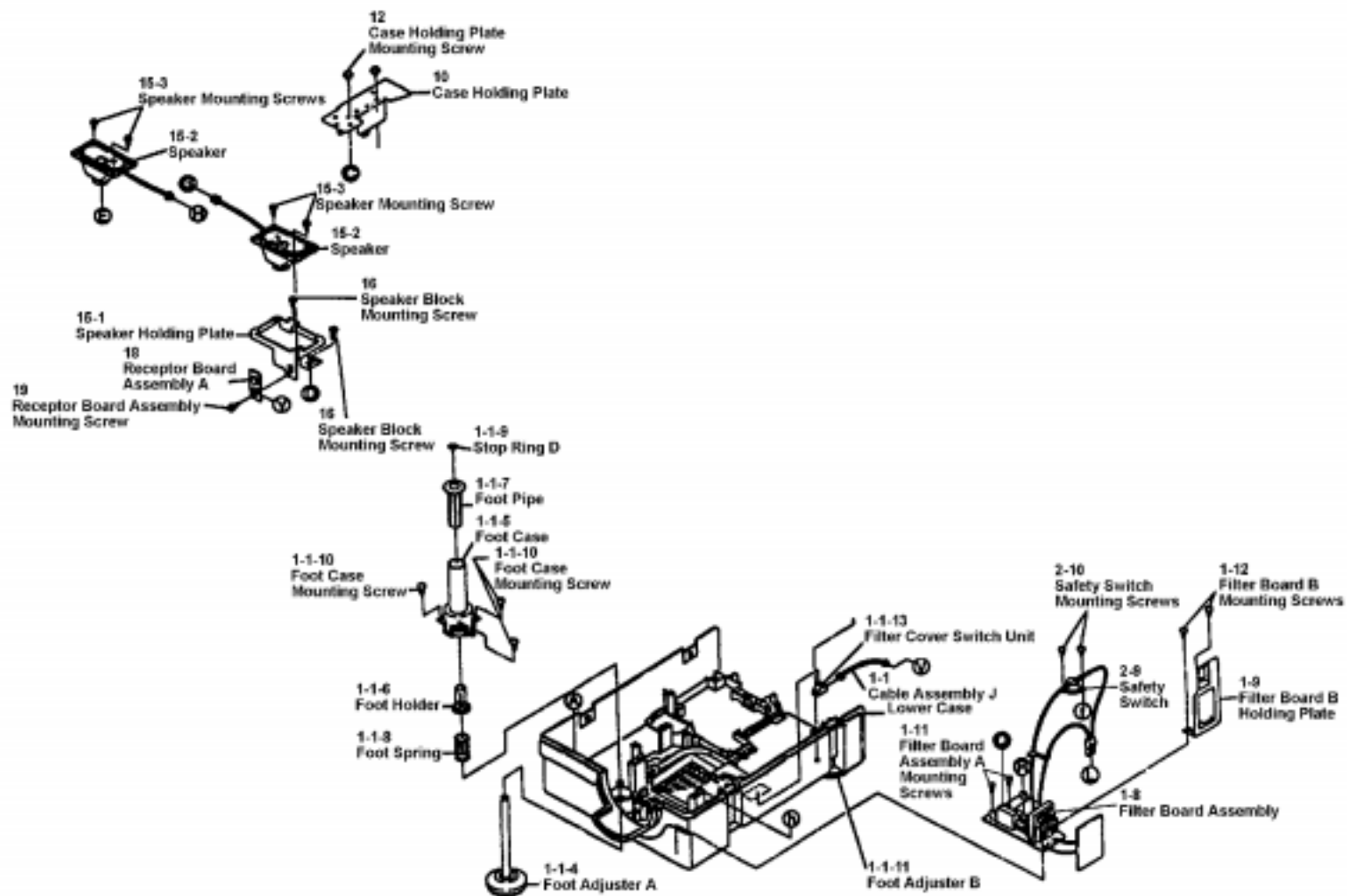
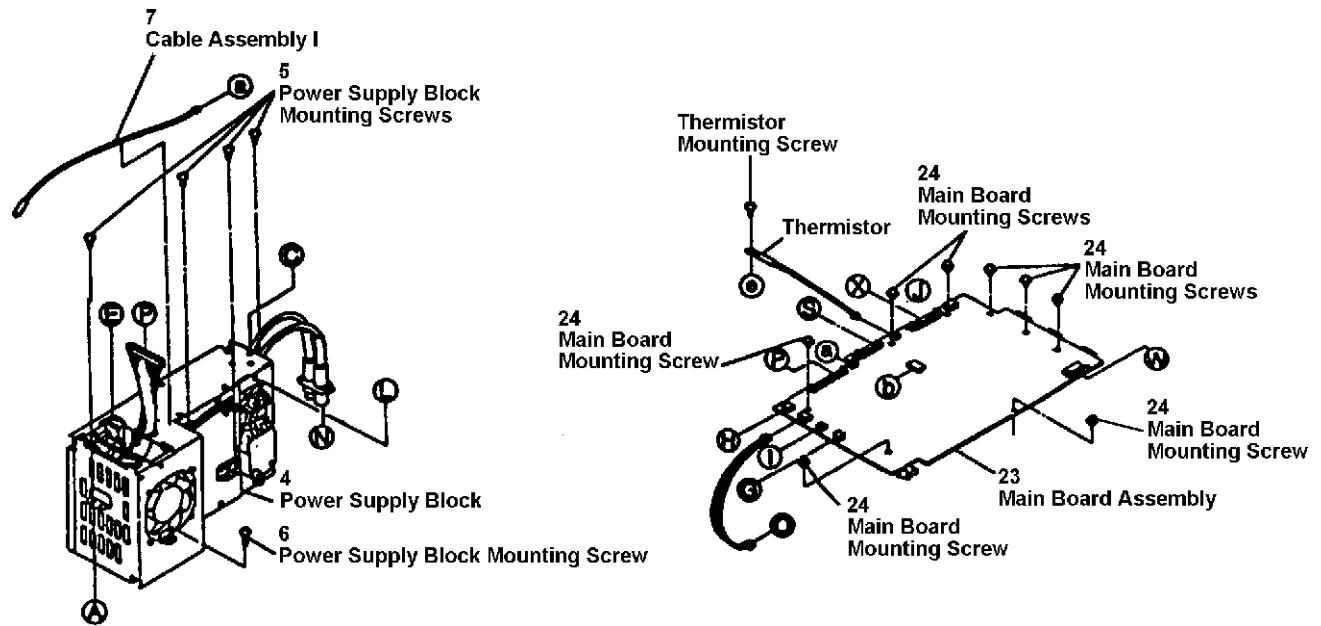


Figure A-2



CASE BLOCK

Figure A-3



P.S. / MAIN BOARD

Figure A-4

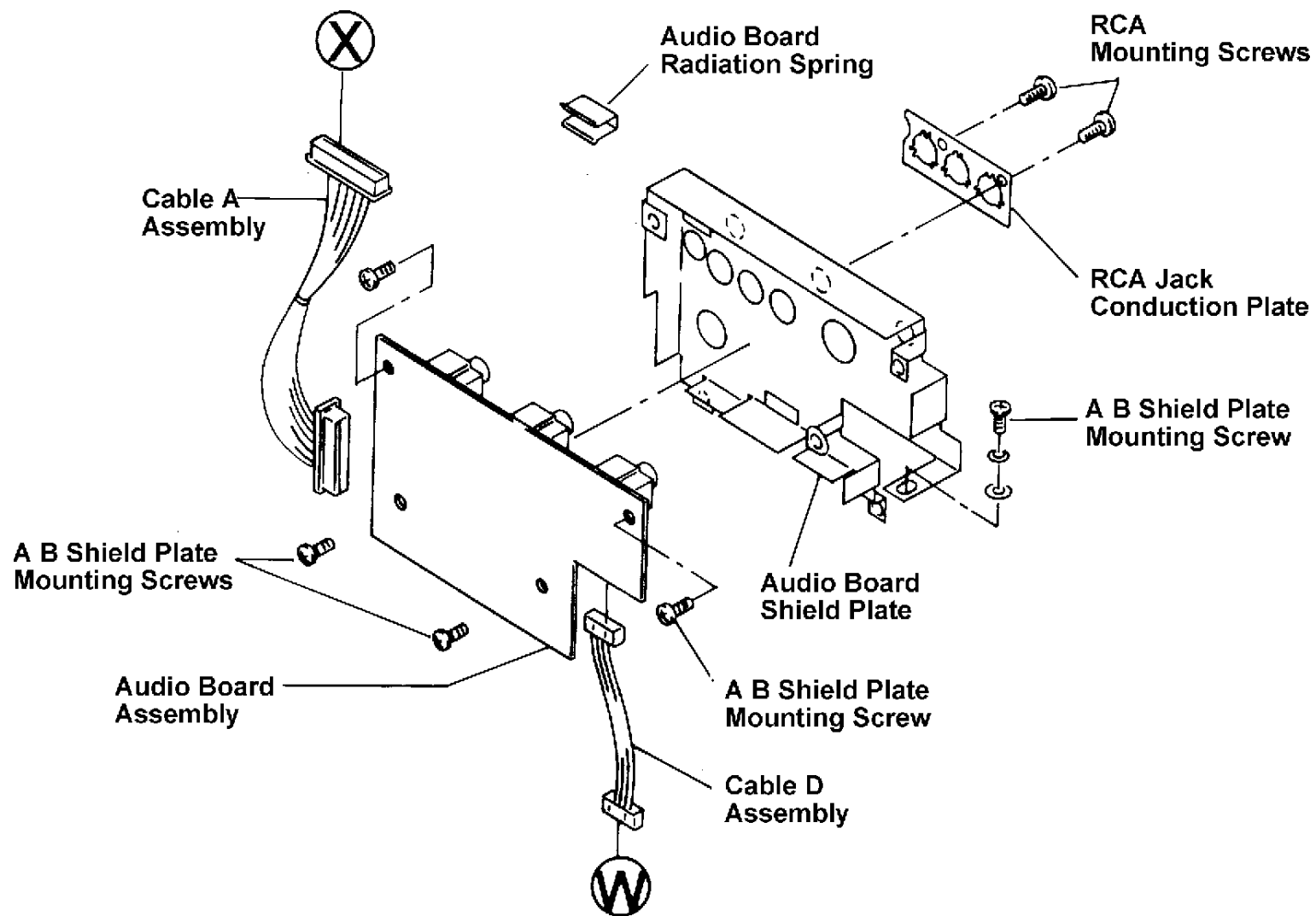


Figure A-5

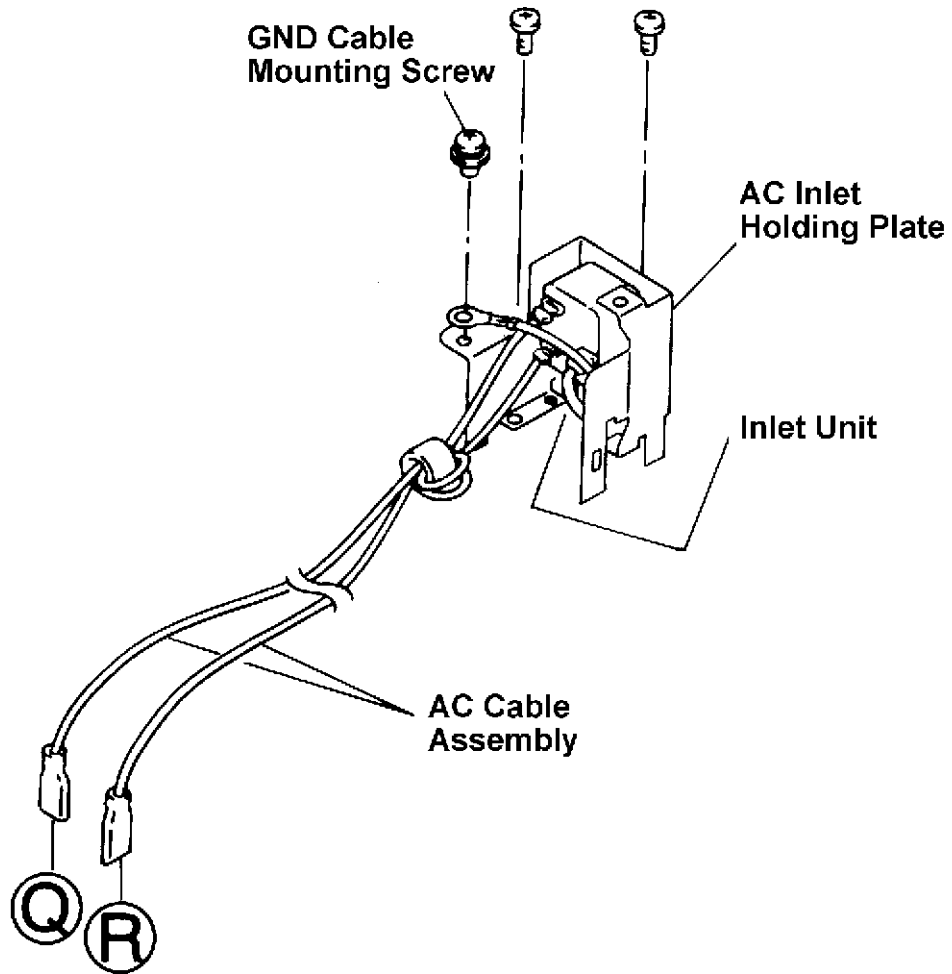


Figure A-6

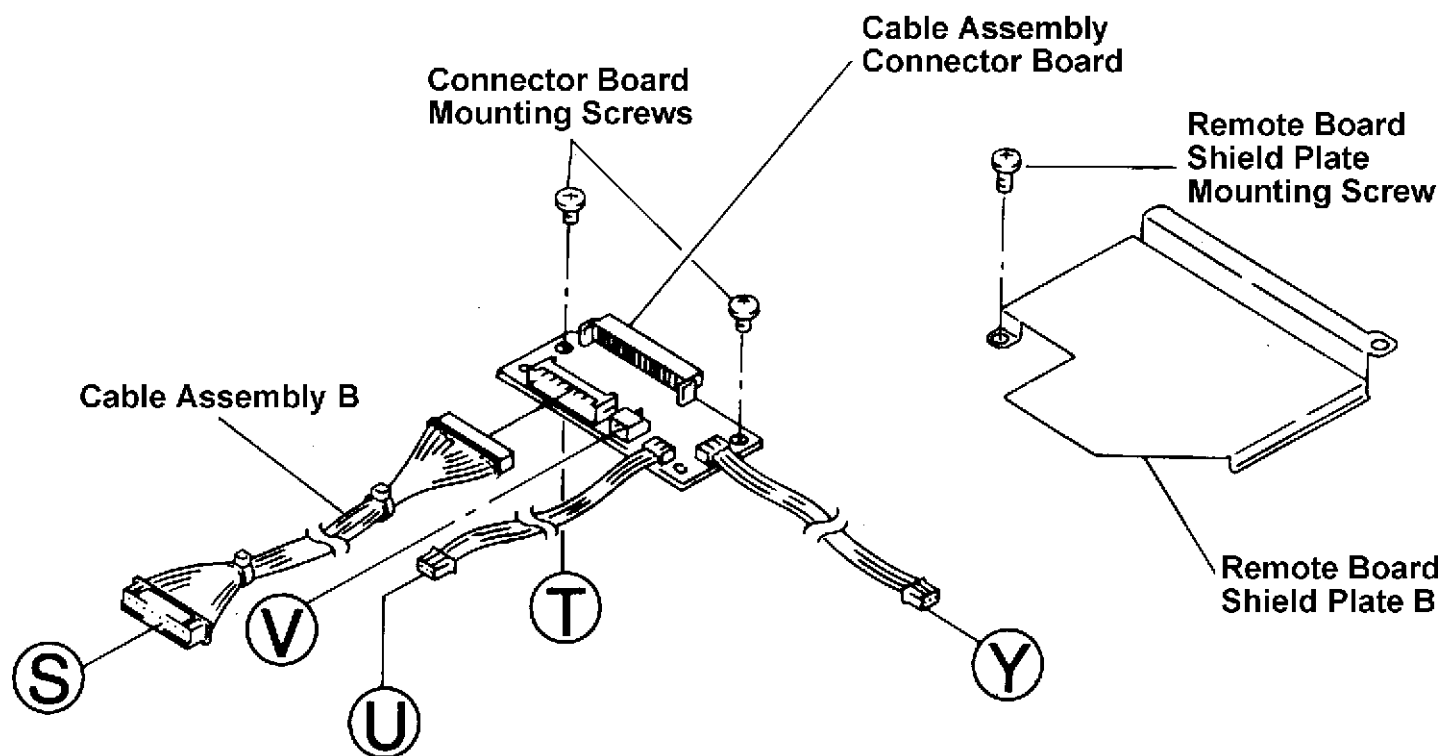


Figure A-7

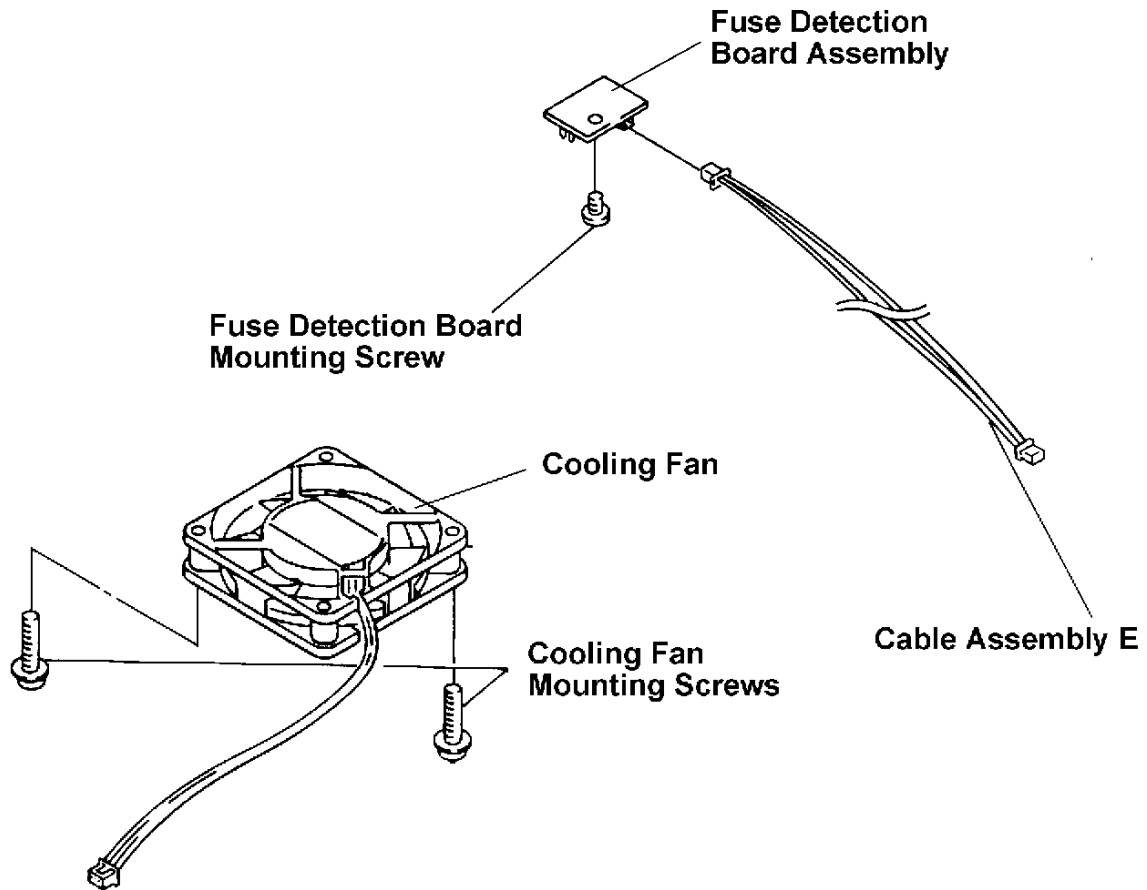


Figure A-8

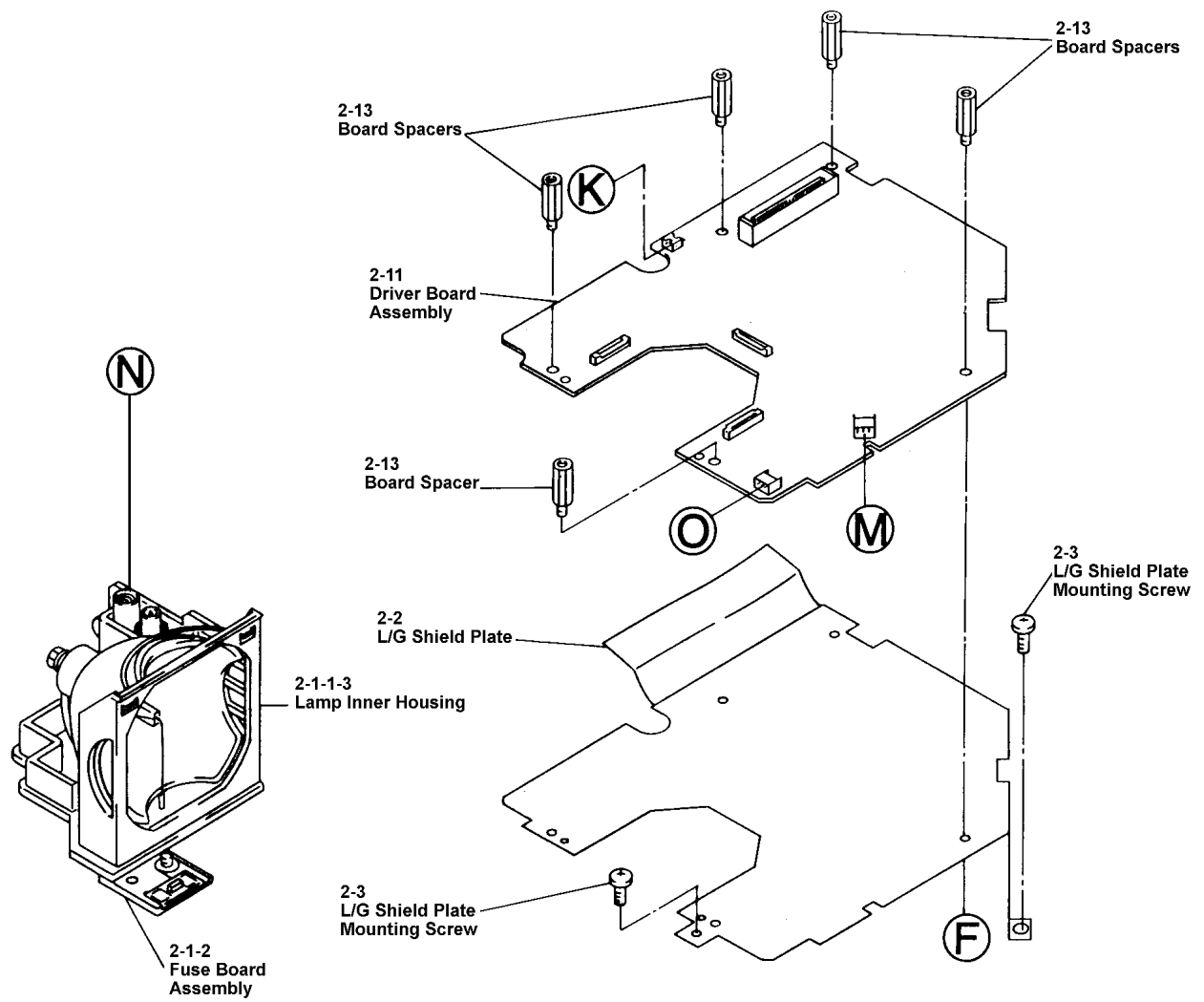


Figure A-10

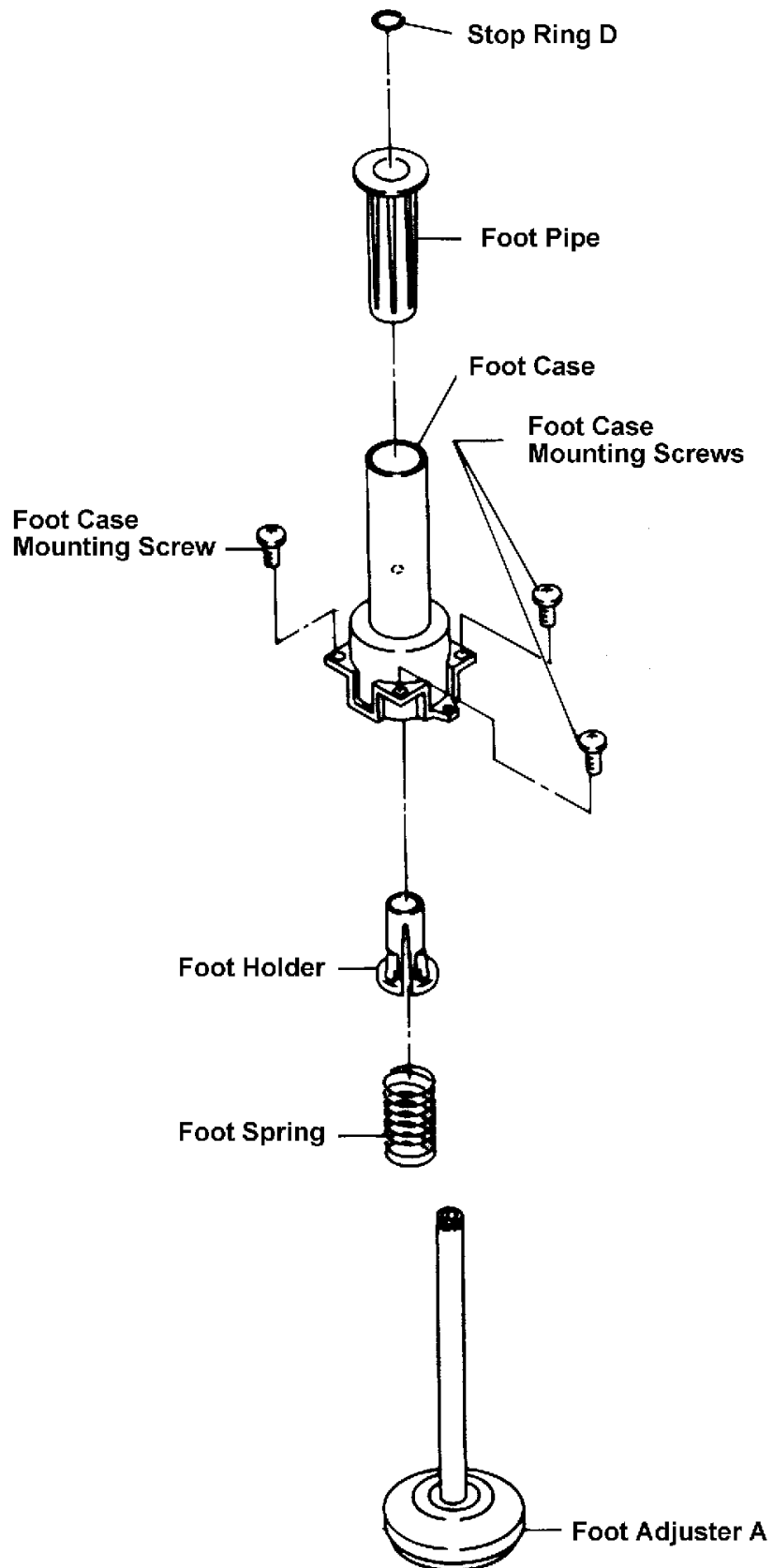


Figure A-11

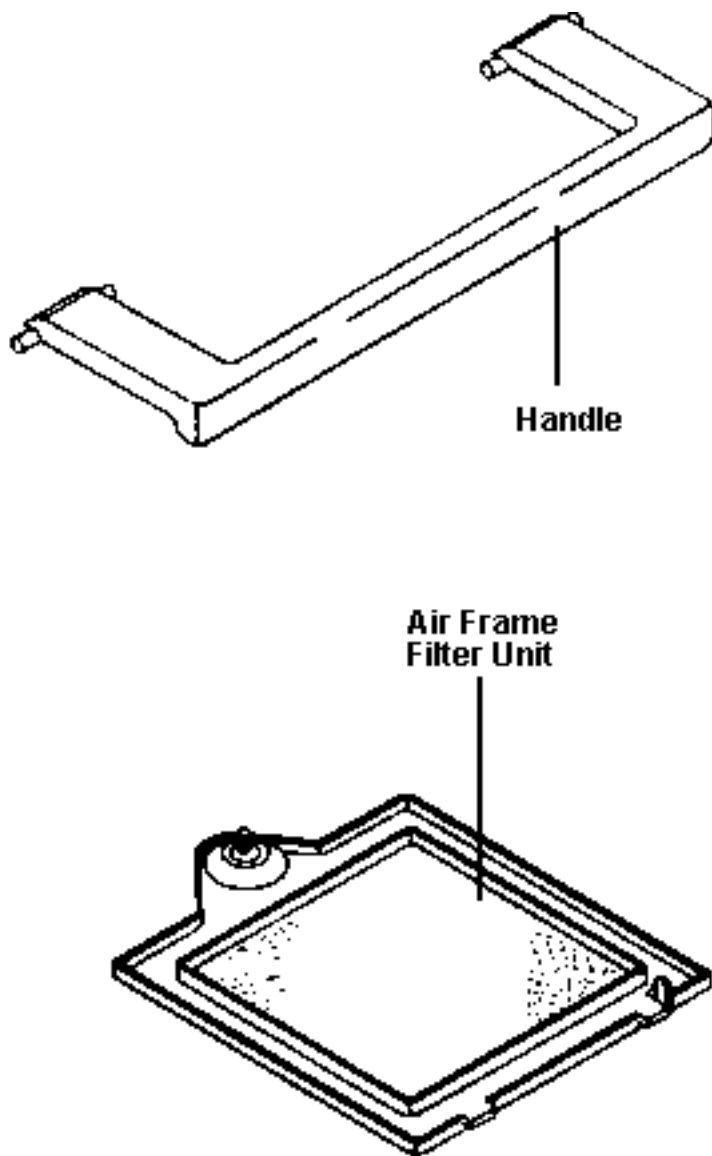


Figure A-12

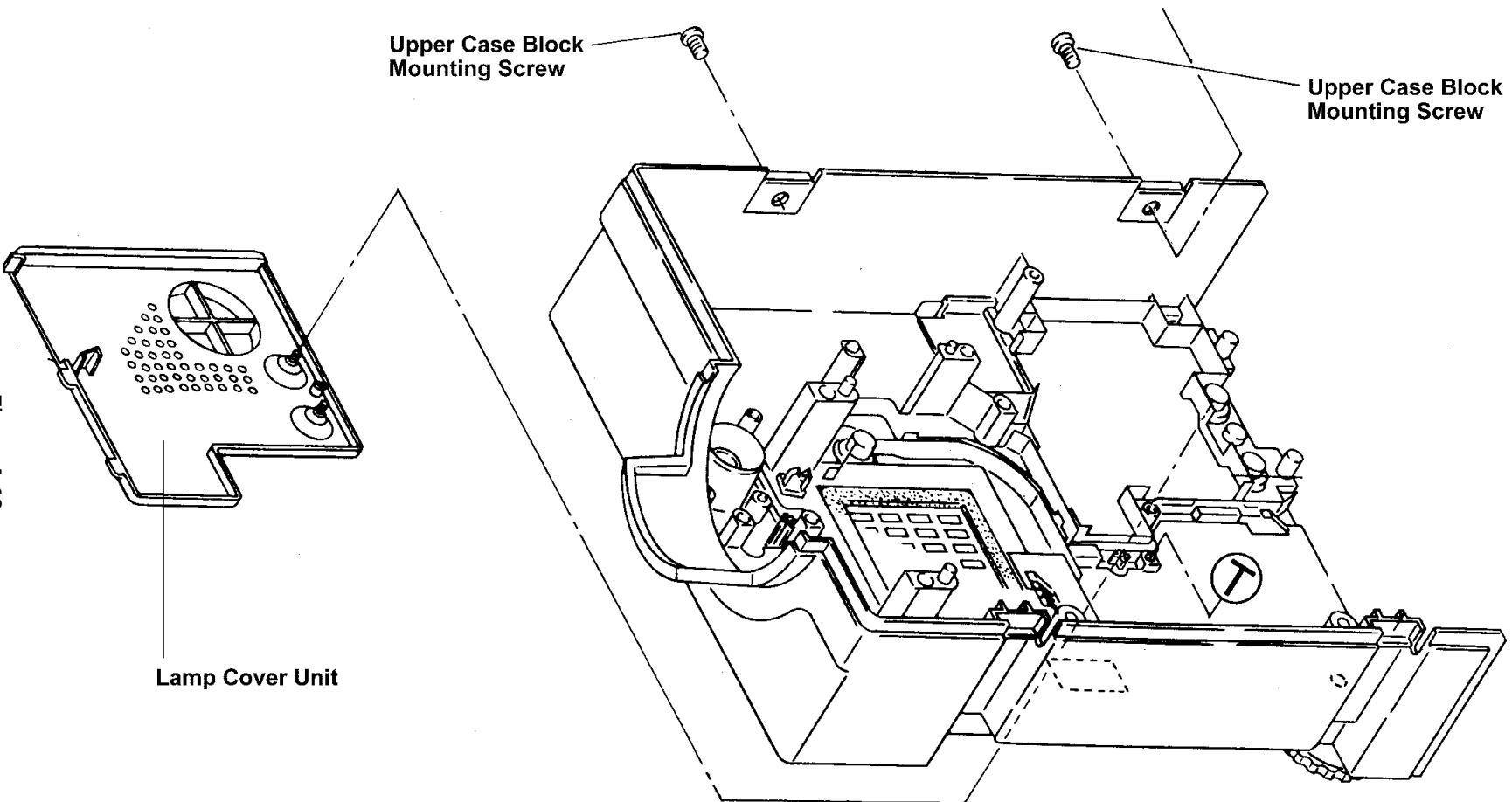


Figure A-13

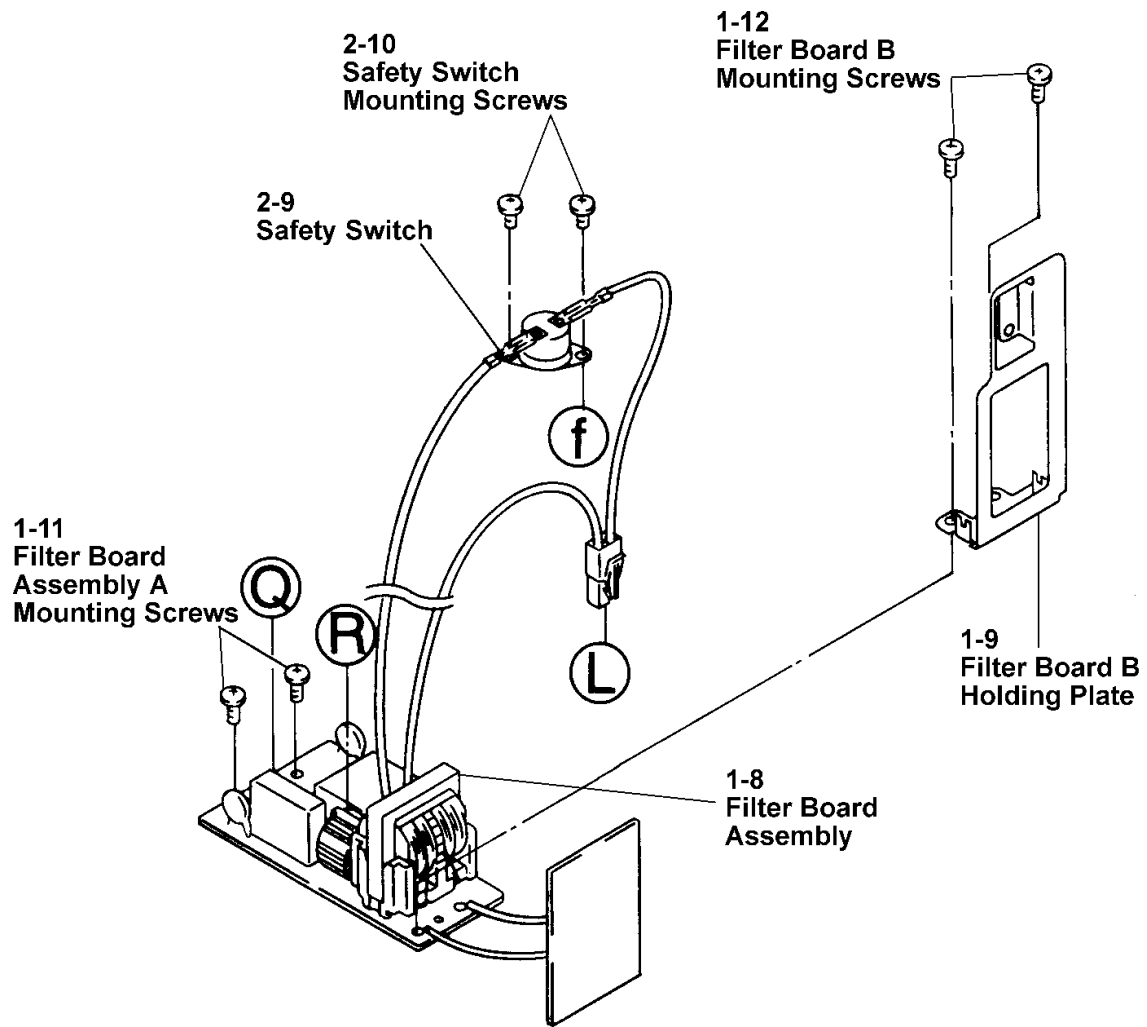


Figure A-14

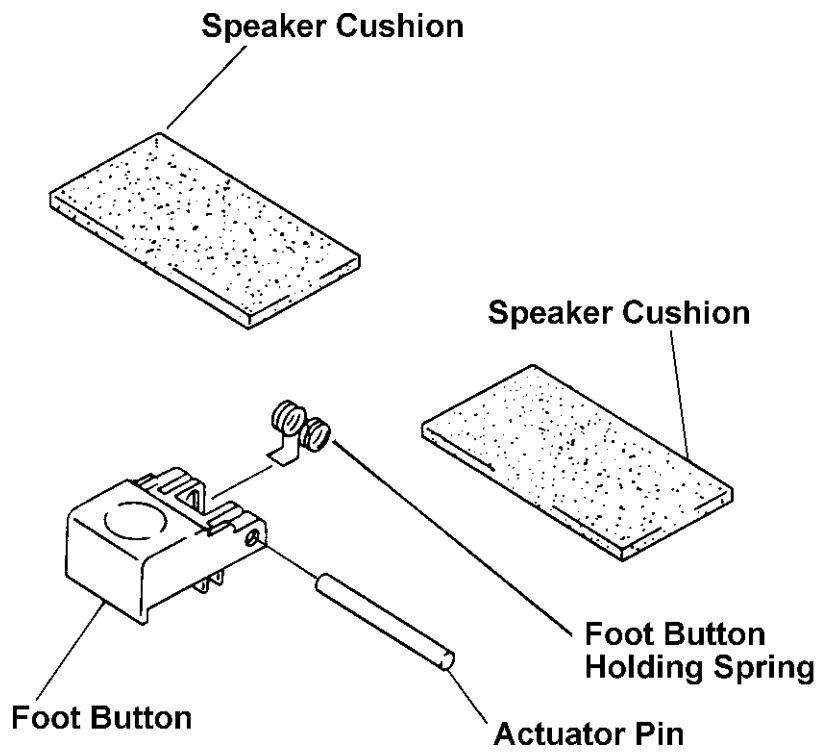


Figure A-14

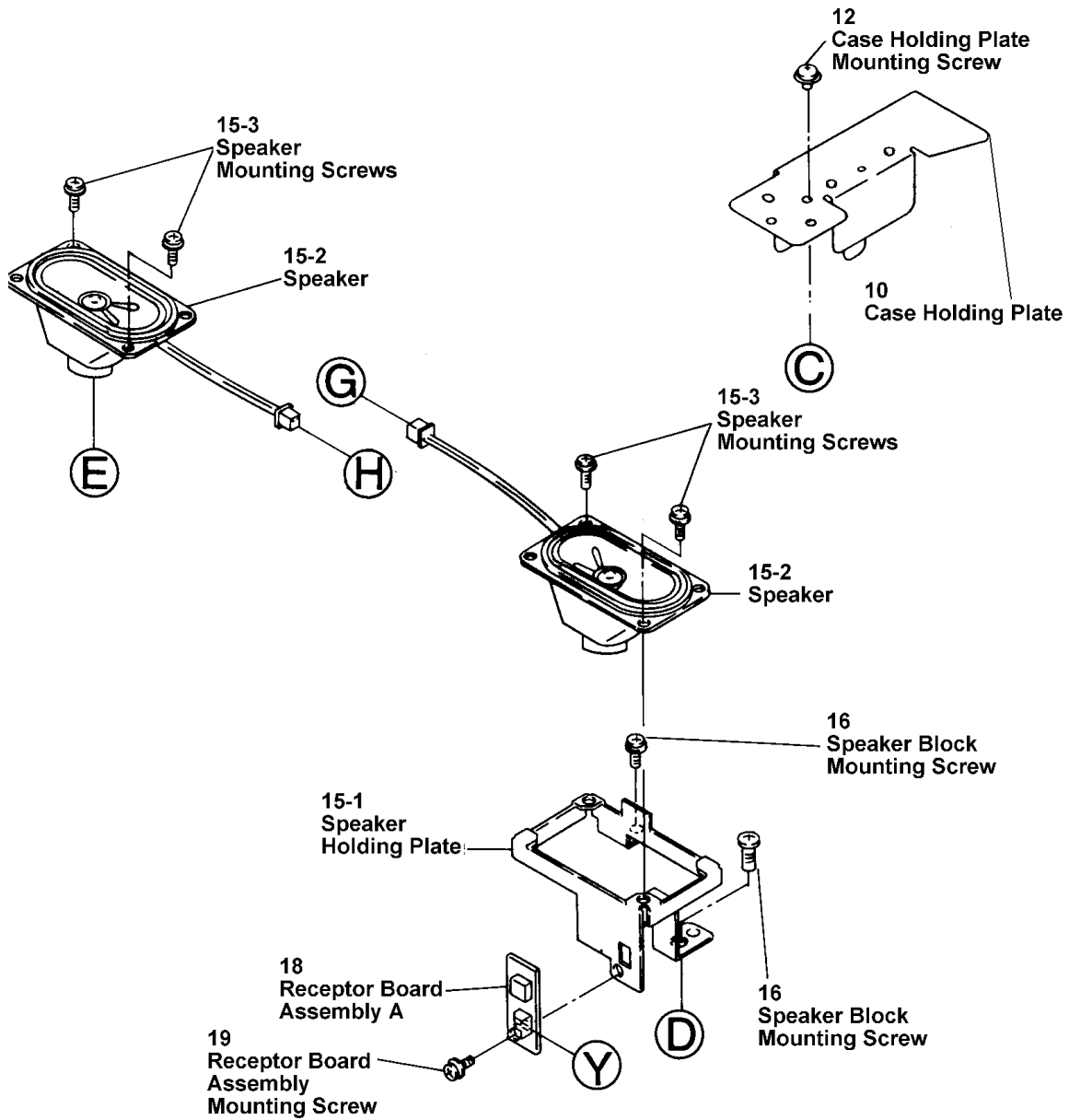


Figure A-15

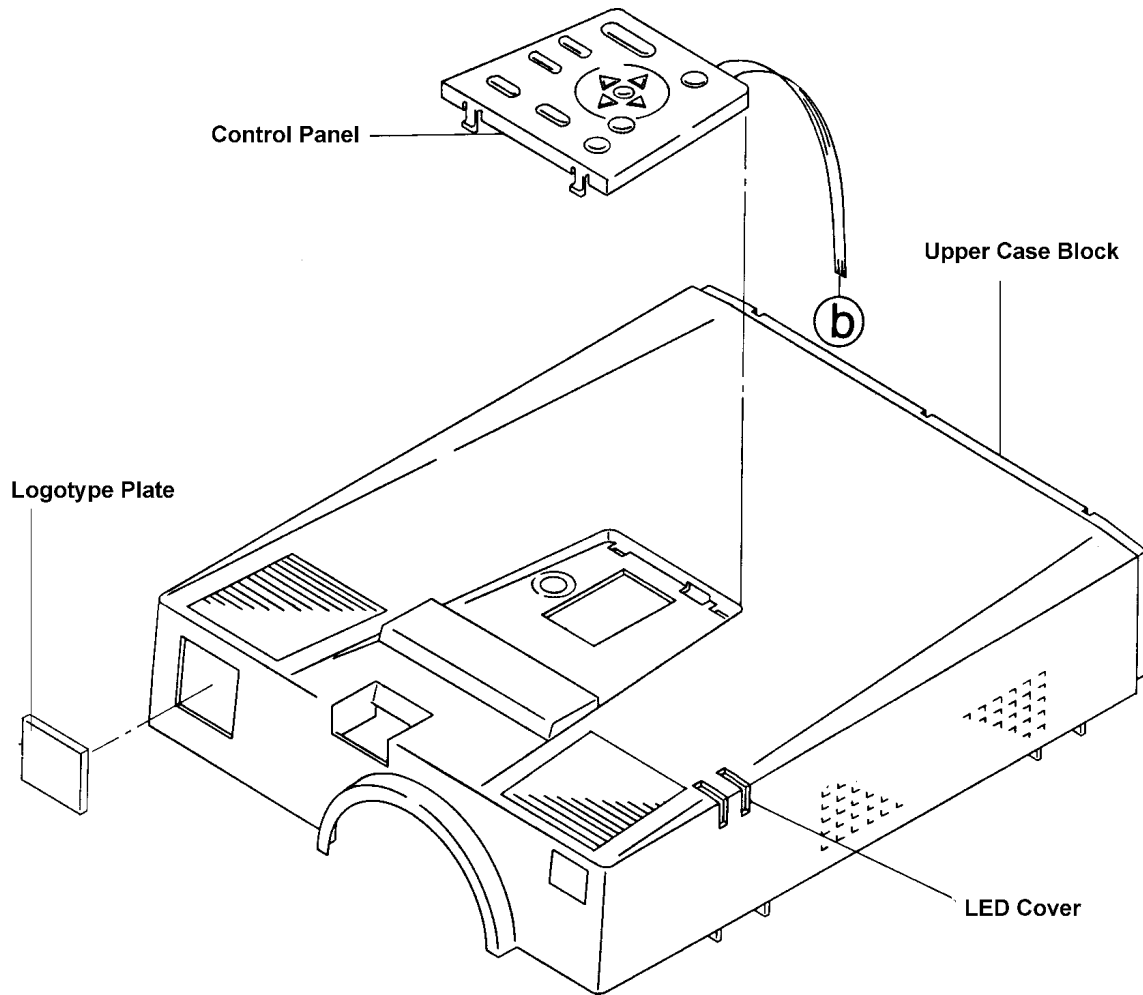


Figure A-16